This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Digitized by Google

COLLEGE OF AGRICULTURE
DAVIS, CALIFORNIA

Digitized by Google

LIBRARY
OF THE
Division of Pomology,
U. S. DEP'T OF AGRICULTURE.
No. .....

SB 2
I7

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

TRANSACTIONS

OF THE

Iowa State Horticultural Society

FOR 1879,

BEING THE

PROCEEDINGS OF THE FOURTEENTH ANNUAL MEETING,

HELD AT DES MOINES, JANUARY 20, 21, 22 & 23, 1880.

TOGETHER WITH THE

Proceedings of the Eastern Iowa Horticultural Society,

ALSO OF THE

WESTERN IOWA HORTICULTURAL SOCIETY, AND OTHER LOCAL SOCIETIES, FOR THE YEAR 1879.

EMBRACING ESSAYS AND DISCUSSIONS IN ALL THE DEPARTMENTS OF SCIENTIFIC AND PRACTICAL HORTICULTURE; WITH LISTS OF TREES AND PLANTS ADAPTED TO THE SEVERAL FRUIT DISTRICTS.

EDITED BY THE SECRETARY, J. L. BUDD, AMES, IOWA.

DES MOINES:
F. M. MILLS, STATE PRINTER.
1880.

UNIVERSITY OF CALIFORNIA
LIBRARY
COLLEGE OF AGRICULTURE
DAVIS

Digitized by Google

Digitized by Google

REPORT TO THE GOVERNOR.

To His Excellency, JOHN H. GEAR, *Governor of Iowa:*

I HAVE the honor to submit herewith, in compliance with legal requisition, the fourteenth volume of Transactions of the Iowa State Horticultural Society for the year 1879.

Obediently yours,

J. L. BUDD,

Secretary.

38027

Digitized by Google

OFFICERS AND DIRECTORS

OF THE

IOWA STATE HORTICULTURAL SOCIETY,

FOR THE YEAR 1879.

PRESIDENT.

C. L. WATROUS, - - - - - - - *Des Moines.*

VICE-PRESIDENT.

E. H. CALKINS, - - - - - - - *Burlington.*

SECRETARY.

J. L. BUDD, - - - - - - - - - *Ames.*

TREASURER.

HENRY STROHM, - - - - - - - *Iowa City.*

DIRECTORS.

First District—JONATHAN THATCHER, - - - *Keosauqua.*
Second District—GEORGE W. SHAW, *Garden Grove, Decatur County.*
Third District—H. C. RAYMOND, - - - - - *Council Bluffs.*
Fourth District—SUEL FOSTER, - - - - - - - *Muscatine.*
Fifth District—H. W. LATHROP, - - - - - - *Iowa City.*
Sixth District—B. F. GUE, - - - - - - - - *Des Moines.*
Seventh District—GEO. H. WRIGHT, - - - - - *Sioux City.*
Eighth District—R. P. SPEER, - - - - - - *Cedar Falls.*
Ninth District—A. J. HAVILAND, - - - - - *Fort Dodge.*
Tenth District—W. H. HALPIN, - - - - - - - *Le Mars.*
Eleventh District—C. G. PATTEN, - - - - - - *Charles City.*
Twelfth District—L. G. IRELAND, - - *Sibley, Osceola County.*

Digitized by Google

OFFICERS AND DIRECTORS

OF THE

IOWA STATE HORTICULTURAL SOCIETY,

FOR THE YEAR 1880.

PRESIDENT.

C. L. WATROUS, - - - - - - - *Des Moines.*

VICE-PRESIDENT.

E. H. CALKINS, - - - - - - - - *Burlington.*

SECRETARY.

J. L. BUDD, - - - - - - - - - *Ames.*

TREASURER.

HENRY STROHM, - - - - - - - *Iowa City.*

DIRECTORS.

First District—JONATHAN THATCHER, - - - *Keosauqua.*
Second District—JOHN N. DIXON, - - - - - *Oskaloosa.*
Third District—H. C. RAYMOND, - - - - *Council Bluffs.*
Fourth District—SUEL FOSTER, - - - - - *Muscatine.*
Fifth District—H. W. LATHROP. - - - - - *Iowa City.*
Sixth District—JOHN N. WRAGG, - - - - - *Waukee.*
Seventh District—GEO. H. WRIGHT, - - - - *Sioux City.*
Eighth District—R. P. SPEER, - - - - - - *Cedar Falls.*
Ninth District—A. J. HAVILAND, - - - - *Fort Dodge.*
Tenth District—A. H. LAWRENCE, - - - - *Le Mars.*
Eleventh District—C. G. PATTEN, - - - - - *Charles City.*
Twelfth District—L. G. IRELAND, - - - - - - *Sibley.*

Digitized by Google

FRUIT DISTRICTS OF IOWA.

REPRESENTED BY THE DIRECTORS NAMED ON PRECEDING PAGE.

First District—Is composed of the counties of Lee, Des Moines, Louisa, Henry, Washington, Jefferson, Van Buren, Keokuk, Wapello, and Davis.

Second District—Mahaska, Monroe, Appanoose, Marion, Lucas, Wayne, Clarke, Decatur, Ringgold, and Union.

Third District—Adams, Taylor, Montgomery, Page, Mills, Fremont, Pottawattamie, Cass, Audubon, Shelby, and Harrison.

Fourth District—Muscatine, Scott, Clinton, Jackson, Jones, Cedar, and Linn.

Fifth District—Benton, Johnson, Iowa, Tama, Poweshiek, Marshall, and Jasper.

Sixth District—Story, Polk, Warren, Boone, Dallas, Madison, Adair, Greene, and Guthrie.

Seventh District—Carroll, Crawford, Monona, Woodbury, Ida, and Sac.

Eighth District—Dubuque, Clayton, Delaware, Fayette, Buchanan Black Hawk, Bremer, and Grundy.

Ninth District—Butler, Franklin, Hardin, Wright, Hamilton, Humboldt, Webster, Calhoun, and Pocahontas.

Tenth District—Buena Vista, Cherokee, Plymouth, Sioux, and O'Brien.

Eleventh District—Allamakee, Winneshiek, Howard, Chickasaw, Mitchell, Floyd, Worth, and Cerro Gordo.

Twelfth District—Winnebago, Hancock, Kossuth, Emmet, Palo Alto, Dickinson, Clay, Osceola, and Lyon.

Digitized by Google

NAMES OF MEMBERS FOR 1880.

THIS list includes names received to date of writing this report. By provision of by-laws memberships expire upon the day preceding the annual meeting in January in each year. Membership fee, one dollar:

NAMES.	RESIDENCE.
G. H. Wright	Sioux City.
Wm. Larrabee	Clermont.
E. H. Calkins	Burlington.
John Haddock	Iowa City.
H. Strohm	Iowa City.
A. E. Garrison	Des Moines.
R. W. Day	Atlantic.
Geo. Van Houten	Lenox.
J. C. Smith	Des Moines.
J. E. Nealy	Grinnell.
P. E. Freeman	Grinnell.
L. G. Ireland	Sibley.
J. N. Dixon	Oskaloosa.
Silas Wilson	Atlantic.
J. Wragg	Waukee.
Geo. S. Bacon	Magnolia.
C. G. Patten	Charles City.
A. J. Haviland	Fort Dodge.
Geo. W. Shaw	Garden Grove, Decatur county.
J. J. Smart	Des Moines.
L. L. Trueblood	Indianola.
A. D. Keller	Adair.
Fitch B. Stacy	Stacyville.
S. W. Wilson	Atlantic.
D. F. Bruner	Toledo.
Nathan Schee	Milo, Warren county.
Jos. Z. Moore	Guthrie.
R. P. Speer	Cedar Falls.
Joseph Bancroft	Cedar Falls.
Geo. Raumbach	Cedar Falls.
Suel Foster	Muscatine.
A. S. Kingman	Des Moines.

Digitized by Google

NAMES.	RESIDENCE.
G. O. Hilton	Keokuk.
N. J. Harris	Des Moines.
W. E. Chapin	Des Moines.
C. L. Watrous	Des Moines.
J. L. Budd	Ames.
Peter Lambert	Des Moines.
H. R. Teller	Albia.
George L. Hard	Atlantic.
Al. Swalm	Des Moines.
T. C. Beach	Oskaloosa.
N. T. Case	Des Moines.
S. S. Jones	Des Moines.
H. C. Raymond	Council Bluffs.
A. Kemble	Oskaloosa.
John Scott	Nevada.
A. J. Graves	Ames.
W. C. Culp	Davenport.
H. Y. Rogers	Des Moines.
W. D. F. Lummins	Paton.
C. B. Roger	Dallas Center.
C. W. Dorr	Des Moines.
James Schee	Milo, Warren county.
C. F. Kemble	Des Moines.
James Stanton	Des Moines.
James W. Foster	Panora.
B. F. Gue	Des Moines.
L. W. Maulsby	Dexter.
H. Hutsonpiller	East Des Moines.
Jonathan Thatcher	Keosauqua.
J. B. Chadwick	Des Moines.
Pliny Nichols	West Liberty.
H. W. Lewis	St. Joseph, Missouri.
David Bridenstein	Atlantic.
F. W. Hart	Mount Vernon.
E. M. Guffin	Iowa City.
J. M. Woodrow	Newton.
C. R. Potter	Stuart.
A. H. Lawrence	Le Mars.
H. T. Maulsby	Mill Brook, Kansas.
Ranzel Carter	Des Moines.
J. Duncan Putnam	Davenport.
Mrs. Chas. E. Putnam	Davenport.
E. Howell	Des Moines.
Robert Briley	Newton.
James Marshall	Des Moines.

Digitized by Google

NAMES.	RESIDENCE.
George Avery	Oskaloosa.
S. Bowers	Cedar Rapids.
J. H. Bruning	Kent, Union county.
Louis Koeper	Marshalltown.
T. E. B. Mason	Shenandoah.
Fred Schafer	Malcolm.
R. N. Day	Tecumseh, Nebraska.
A. J. Cruse	Shenandoah.
E. R. Shankland	Dubuque.
G. G. Clute	Manchester.
J. J. Snouffer	Cedar Rapids.
J. Lonsdale	Dale City.
Isaac T. Hill	Stanford.
R. M. Hunter	Ames.

HONORARY LIFE MEMBERS.

J. B. Grinnell	Grinnell.
James Smith	Des Moines.
G. B. Brackett	Denmark.
Suel Foster	Muscatine.
H. W. Lathrop	Iowa City.
Peter M. Gideon	Excelsior Mine.
C. F. Clarkson	Des Moines.
J. H. Gear	Des Moines.
A. S. Welch	Ames.

LIFE MEMBERS.*

H. A. Teller	Albia, Iowa.

* A life membership is $5.00. This fund is for permanent investment, the interest only to be used. It is hoped that the list will be much extended during the year.

Digitized by Google

STANDING COMMITTEES FOR 1880.

GENTLEMEN named on these committees are earnestly requested to report separately, not only on matters pertaining to practical Horticulture in its various divisions, but on all scientific topics underlying the art. Reports will be read at the annual meeting at Cedar Falls, commencing on third Tuesday in January, 1881, and will be published in the annual volume of the society.

BOTANY IN ITS RELATIONS TO HORTICULTURE.

FRUIT BLOSSOMS, THEIR CHARACTERISTICS AND FUNCTIONS.

PROF. C. E. BESSEY.....*Ames.*

ROCKY MOUNTAIN CONIFERS AND SHRUBS.

DR. C. C. PARRY.....*Davenport.*

DESIRABLE NATIVE SHRUBS AND PLANTS.

J. C. ARTHUR.....*Madison, Wis.*

GEOLOGY AND SOILS.

PROF. J. K. MACOMBER.....*Ames.*
PROF. S. CALVIN.....*Iowa City.*
W. J. McGEE.....*Farley.*

ENTOMOLOGY.

THE ASH TREE BORER.

H. OSBORN.....*Ames.*

NEW CABBAGE BUTTERFLY.

DR. AUG. HOFFMEISTER.....*Fort Madison.*

THE BLISTER AND RUST PRODUCING MITES.

J. D. PUTNAM.....*Davenport.*

THE APPLE TREE LEAF ROLLERS.

HON. J. N. DIXON.....*Oskaloosa.*

Digitized by Google

METEOROLOGY.

DR. G. HINRICHS.....*Iowa City.*
H. W. LATHROP.....*Iowa City.*

EXPERIMENTAL HORTICULTURE.

NEW FRUITS OF NORTHERN ORIGIN.

C. G. PATTEN.....*Charles City.*
EDSON GAYLORD.....*Nora Springs.*

NEW PEARS, CHERRIES AND PLUMS.

PROF. J. L. BUDD.....*Ames.*

NEW GRAPES AND SMALL FRUITS.

HENRY AVERY.....*Burlington.*

WHAT APPLES ARE MOST PROLIFIC FOR MARKET—WHAT FOR HOME USE, AND HOW TO GROW THEM.

Z. HOLLINGSWORTH.....*Montrose (South).*
C. L. WATROUS.....*Des Moines (Central).*
—— BARNARD.....*Waukon (North).*

NOMENCLATURE.

G. B. BRACKETT.....*Denmark.*
D. W. ADAMS.....*Waukon.*
JOHN C. SMITH.....*Des Moines.*

FORESTRY ANNUAL.

PROF. J. L. BUDD.....*Ames.*
HON. SUEL FOSTER.....*Muscatine.*
H. C. RAYMOND.....*Council Bluffs.*

WHAT SMALL FRUITS SHALL WE PLANT, AND HOW CULTIVATE FOR HOME USE AND FOR MARKET?

T. J. PITTS.....*Nashua.*
AL. SWALM.....*Des Moines.*
C. P. HUNT.....*Waterloo.*

FLORICULTURE.

GREEN-HOUSE MANAGEMENT.

JEROME BOCK.....*Burlington.*

HOLLAND BULBS.

J. BANCROFT.....*Cedar Falls.*

HOUSE PLANTS.

MRS. JAMES DAVIDSON.....*Monticello.*

Digitized by Google

LAWNS—WHAT TO PLANT IN THEM, AND HOW TO CARE FOR THEM.

SHRUBS AND ROSES.

GEORGE F. HARD.....*Atlantic.*

BEDDING PLANTS.

J. A. FOWLER.....*Waterloo.*

ANNUALS.

DR. W. C. KULP.....*Davenport.*

ORNAMENTAL TREES—DECIDUOUS AND EVERGREEN—WHERE TO PLANT AND HOW TO CARE FOR THEM.

HON. WM. LARRABEE.....*Clermont.*
E. H. SMITH.....*Dubuque.*
LAWRIE TATUM.....*Springdale.*

HOW FAR IS IT PROFITABLE TO PLANT TIMBER BELTS FOR THE PROTECTION OF CROPS?

HON. C. E. WHITING.....*Whiting.*
L. G. IRELAND.....*Sibley.*
J. PEDDIE.....*Emmetsburgh.*

UTILIZING SURPLUS FRUITS AND VEGETABLES.

APPLES.

E. H. CALKINS.....*Burlington.*

SMALL FRUITS.

AMOS KEMBLE.....*Oskaloosa.*

VEGETABLES.

S. H. WATSON.....*Vinton.*

VEGETABLE GARDENING.

IMPLEMENTS AND SEEDS.

C. W. DORR.....*Des Moines.*

NOVELTIES OF THE GARDEN.

L. G. CLUTE.....*Manchester.*

GARDEN MANAGEMENT.

J. L. PERKINS.....*Little Sioux.*

Digitized by Google

HEDGES—1, AS BARRIERS; 2, AS WIND-BREAKS.

WHITE WILLOW.

THOMAS WARDALL.....*St. Ansgar.*

HONEY LOCUST.

J. W. MYERS.....*Hampton.*

OSAGE ORANGE.

GEORGE H. VAN HOUTEN.....*Lenox.*

OUR USEFUL BIRDS.

PROF. F. E. L. BEAL.....*Ames.*
COL. G. B. BRACKETT.....*Denmark.*
C. A. MOSIER.....*Des Moines.*

SPECIAL TOPICS.

SOME THINGS TRIED AND FOUND WANTING IN TWENTY YEARS OF IOWA HORTICULTURE.

B. A. MATHEWS.....*Knoxville.*

PROPAGATION OF SHRUBS.

R. ROYCE.....*Shellsburgh.*

PROPAGATION OF CONIFERS.

A. GIDDINGS.....*Sabula.*

FORMS OF PLANT LIFE.

HON. A. S. WELCH.....*Ames.*

WHY SHOULD WE BUILD FENCES?

HON. J. B. GRINNELL.....*Grinnell.*

ARE ORCHARD "WIND-BREAKS" DESIRABLE?

J. B. CRIPPS.....*Albion.*

PROPAGATING PITS.

J. H. PEARSON.....*Ainsworth.*
J. SEXTON.....*Ames.*

MISTAKES IN ORCHARDING.

HON. R. P. SPEER.....*Cedar Falls.*

MISTAKES IN PEAR GROWING.

COL. G. B. BRACKETT.....*Denmark.*

PROMISING ORNAMENTAL TREES AND SHRUBS OF EUROPEAN ORIGIN.

J. NEALLY.....*Burlington.*

FERTILIZERS FOR ORCHARDS AND SMALL FRUITS.

S. BOWERS.....*Cedar Rapids.*

Digitized by Google

PICKING, PACKING, AND PRESERVING APPLES.

GEO. W. SHAW.....*Garden Grove*

SYSTEM IN FRUIT EXHIBITS.

E. H. CALKINS.....*Burlington*

THE CHEMISTRY OF FRUIT RIPENING.

PROF. J. S. LEE.....*Des Moines.*

COMMITTEE ON DISTRIBUTION OF NEW FRUITS AND TREES.

C. L. WATROUS.....*Des Moines.*
PROF. J. L. BUDD.....*Ames.*
H. STROHM.....*Iowa City.*
H. C. RAYMOND.....*Council Bluffs.*
C. G. PATTEN.....*Charles City.*

COMMITTEE ON CATALOGUE.

C. L. WATROUS.....*Des Moines.*
PROF. J. L. BUDD.....*Ames.*
G. B. BRACKETT.....*Denmark.*

COMMITTEE ON ARRANGEMENTS FOR FARMERS' INSTITUTES.

PROF. J. L. BUDD.....*Ames.*
COL. G. B. BRACKETT.....*Denmark.*
HON. SUEL FOSTER.....*Muscatine.*

COMMITTEE TO ATTEND FARMERS' INSTITUTES.

Southern District—
G. B. BRACKETT.....*Denmark.*
HON. SUEL FOSTER.....*Muscatine.*

Central District—
H. W. LATHROP.....*Iowa City.*
H. C. RAYMOND.....*Council Bluffs.*

Northern District—
HON. GEO. H. WRIGHT.....*Sioux City.*
C. G. PATTEN.....*Charles City.*

Digitized by Google

IOWA STATE HORTICULTURAL SOCIETY.

LIST OF PREMIUMS

Offered for the Encouragement of Forest Tree Planting.

THE following premiums are offered to encourage the planting of trees in permanent timber plantations or belts; the number of trees living to be ascertained by actual count between the 15th of September and the 10th of October, 1880. The awards of the premium to depend upon a full compliance with the rules appended to the schedule of premiums.

For the greatest number planted in groves; intrinsic value of species considered	$ 40 00
Second greatest number	25 00
Third greatest number	10 00
For the greatest number of Evergreens and Larch in plantations or belts	20 00
Second greatest number	15 00
Third greatest number	10 00
For the greatest number of Ash trees	20 00
Second greatest number	15 00
Third greatest number	10 00
The greatest number of Nut Bearing trees, including Oaks	20 00
Second greatest number	15 00
Third greatest number	10 00
For the greatest number of Black Wild Cherry, Elm, Box Elder, and Birch	20 00
Second greatest number	15 00
Third greatest number	10 00
For the greatest number of Cottonwood, Basswood, Willow, Maple, and other soft-wooded trees	20 00
Second greatest number	15 00
Third greatest number	10 00
For the greatest number of Honey Locust (from seed grown on thornless trees is preferable)	20 00
Second greatest number	15 00
Third greatest number	10 00

Digitized by Google

REGULATIONS.

1st. Persons competing for premiums must designate the class for which they compete, as, for greatest number of Soft-Wooded Trees, greatest number Evergreens, Larch, etc. A plantation may consist of a single variety enumerated, or any number of the kinds mentioned.

2d. Additional plantations must be made for each separate entry for premiums. In other words, a person awarded a premium in one class will not be entitled to premium on same trees in another class.

3d. The plantations competing for these premiums must be made with rooted seedlings or plants, with the exceptions here mentioned: Of Willows and Soft-Wooded trees, growing readily from cuttings, strong cuttings may be used. In the class of Nut Bearing Trees, White Walnut, Black Walnut, and Oak may be started from seed where wanted to remain. Plantations of Ash, Maple, Black Cherry, or any other forest tree, may be started from seeds, where they are to stand permanently, but they cannot be entered for premium until the close of the second year's growth.

4th. All trees, seeds, and cuttings must be planted in permanent timber plantations or belts, in the spring of 1880, except where parties failed to get a sufficient stand in 1879, they may replant in 1880. The plantations must not be made at a greater distance than four feet each way; when counted there must be at least two thousand trees to each acre. The plantations competing for a premium must be on one farm, but need not be contiguous.

5th. The competitor must have his trees counted by two disinterested witnesses between the 15th of September and 10th of October, counting only those that are alive at that time. After counting, competitor must make affidavit before a Justice of the Peace or Notary Public, as to the following facts:

A. Whole number of trees in permanent grove, planted in spring of 1880, and now alive, or if it is a replanted grove, planted in 1879, state the fact.

B. Name and number of each kind planted.

C. How planted.

D. How cultivated.

E. Cost of plantation.

F. Average size of each species of tree.

The parties who counted the trees must append their affidavit as to the correctness of the count. The officer who administers the affidavit shall certify to the identity and credibility of the competitor, and the parties who counted the trees.

6th. The above described affidavit to be forwarded to the Secretary of the State Horticultural Society, Joseph L. Budd, Ames, Story county, Iowa, not later than December 1st, 1880.

7th. Premiums will be awarded at the next annual meeting of the Society, at the city of Cedar Falls, on the third Tuesday in January, 1881.

C. L. WATROUS, *President.*

J. L. BUDD, *Secretary.*

Digitized by Google

PREMIUMS.

PREMIUMS ON FRUITS AND FLOWERS.

To be awarded at the annual meeting of the State Horticultural Society, at Cedar Falls, third Tuesday in January, 1881.

WHERE the word "fruit" occurs in this list, grafted fruit is meant, except where otherwise specified.

Best collection of Fruit grown in any one county	$20 00
Second best collection of Fruit grown in any one county	10 00
Best collection of Fruit grown in any county in Northern Iowa, north of the north line of Clinton county	20 00
Second best collection of Fruit grown in any county of Northern Iowa, north of the north line of Clinton county	10 00
Best collection of Fruit grown by exhibitor	10 00
Second best collection grown by exhibitor	5 00
Best collection of Seedling Apples grown by exhibitor	10 00
Second best collection of Seedling Apples grown by exhibitor	5 00
Best collection of Winter Pears	5 00
Best peck of Apples—quality alone to be considered (awarded by the Society)	5 00
Best peck of Apples—profit alone to be regarded (awarded by the Society)	5 00
Most promising Seedling Apple originated at the North	5 00
The same, for Central District	5 00
The same, for Southern District	5 00
Most promising Seedling Pear originated at the North	5 00
The same, for Central District	5 00
The same, for Southern District	5 00
The most promising Seedling Cherry originated North	5 00
The same, for Central District	5 00
The same, for Southern District	5 00

NOTE.—Written statement giving the history of the Seedling, and main facts as to hardiness, bearing qualities, etc., must accompany each entry for premiums offered on Seedlings of Apple, Pear, and Cherry, for the several Districts. The North District shall mean all that part of the State north of the north line of Linn county. The Southern District shall mean the portion of the State south of the north line of Washington county; and the Central District shall include the counties, and portions of counties, between north lines of Linn and Washington counties.

Digitized by Google

PREMIUMS ON FLOWERS AND PLANTS.

Best collection of Green-House Plants	$ 15 00
Best collection of House Plants	10 00
Second best collection of House Plants	5 00
Best collection of Foliage Plants	5 00
Best collection of Plants, *in bloom*, including Roses	8 00
Second best collection of Plants, *in bloom*, including Roses	5 00
Best single Foliage Plants	3 00
Best Rose in bloom	3 00
Best Hanging Basket, or vase of vines or plants	3 00

This list of premiums on Flowers and Plants, it is hoped, will bring out large collections. If collections be meager, the Committee may award second premiums, if in their judgment a first premium is not merited.

Exhibitors must make entries with the Secretary for *specific premiums.*

Digitized by Google

RULES FOR JUDGING FRUITS, WITH A PROPOSED SCALE OF POINTS.

ADOPTED BY THE IOWA HORTICULTURAL SOCIETY.

GENERAL RULES.

1st. In all cases the judges are to be governed by the letter and spirit of the schedule under which the exhibitors have made their entries. The general appearance of the fruit, care in its selection, and taste displayed in its arrangement or grouping, each entry being distinctly separated from the rest; these are all elements of the highest importance, and should receive appropriate consideration by the committee.

2d. In every group, whether the single plates, the threes, fives, tens, or larger collections of fruits, there should never be more than one plate of any variety in any one group. Lists of the names of varieties exhibited should accompany each group, and must be attached to the entry card, and have a corresponding number and designation—with or without exhibitor's name, according to the rule.

3d. The same *plates* of fruit cannot compete for different prizes, except in the grand collection of largest display (sweepstakes): though the several entries for the best ten, best five, or other numbers, and the best plate, may embrace the same varieties, but not the same plates of specimens: in each case they must be duplicates, and in sweepstakes they will count for a single variety.

4th. When the schedule prescribes the number of each kind, usually three or five, to be placed on exhibition, the exact number must be presented, neither more nor less.

5th. In general collections of fruit by individuals, counties, or otherwise, when the several species of fruits are specified in the schedule, they must all be presented, or the collections may be passed by the committee.

6th. In all cases, but more especially in the Display, or greatest and best collections, *Number* of varieties is the *prima facie* test of

Digitized by Google

superiority, other things being equal; but quality, relative value, their perfect condition, and tasteful appearance, will be considered, and should rank thus respectively:

1. Number.
2. Quality or value.
3. Condition, approaching perfection.
4. Taste in the display.

To illustrate: on a scale of ten—

	RANK.
No. 1 may have 100 plates—the largest collection	10
Quality: some inferior varieties	5
Condition of fruits: rather poor	5
Taste in the display	5
Total	25
No. 2 may have 90 plates—ranking	8
Quality: superior in most—ranking	8
Condition of fruit: perfect—ranking	10
Taste in the arrangement: good—ranking	9
Total	35

Number two would, in this case, take the premium.

In the case of single plates of the several kinds named, or in a competition for the best plate, or basket of any kind of fruit, we may consider, Condition, Form, Size, Color, and Texture with Flavor.

On the same scale we may have two entries to decide thus:

	NUMBER 1.		NUMBER 2.	
Condition	Perfect	10	Stem lost	8
Form	Abnormal	8	Perfect	10
Size	Overgrown	8	Uneven	6
Color	Perfect	10	Too pale	6
Texture and flavor	Superior	10	Insipid	5
Totals		46		35

This scaling might be used in deciding between any number of single plates of designated varieties, competing with one another, for the best plate of any kind, or for the basket premium, with assortment or single variety according to the words of the schedule.

SPECIAL RULES.

The judges should have an ideal standard of perfection, in all cases, made up of the following particulars:

1st. The *Condition* and general appearance of the fruit—which should be in its natural state, not rubbed nor polished, nor specked,

Digitized by Google

bruised, wormy, nor eroded—with all its parts, stem and calyx-segments—well preserved, not wilted nor shriveled—clean.

2d. The *Size* in Apples and Pears, particularly, should be average and neither over-grown nor small—the specimens should be even in size.

3d. The *Form* should be regular or normal to the variety and the lot even.

4th. The *Color* and *Markings*, or the *Surface* to be in character—not blotched nor scabby.

5th. When comparing different varieties, and even the same kind, grown on different soils, the *Texture* and *Flavor* are important elements in coming to a decision. 5 points.

In the class PEACHES, PLUMS, etc., the important elements are *Size, Form, Color, Flavor,* and *Condition.* 5 points.

In GRAPES we must consider and compare the *Form* and *Size* of the *Bunches*, the *size* of the *berries,* their *color*, *ripeness*, and *flavor* and *condition.* 5 points.

In CURRANTS we shall have to examine the *perfection* and *size* of the *bunches;* and of the *berries*, their flavor and condition. 3 points.

In GOOSEBERRIES we shall look to the *size*, *color*, *flavor*, and *condition* of the fruit. 4 points.

In judging CHERRIES we have as our guide, the *size and form*, the *color*, *flavor*, and *condition.* 4 points.

In judging STRAWBERRIES we shall compare the *size and form*, *color*, *flavor*, *firmness* and *condition.* 5 points. They should be shown with stem and calyx.

RASPBERRIES may be shown with or without the calyx. In this fruit we shall have to judge of the *size*, *color*, *flavor* and *condition.* 4 points.

BLACKCAPS must have *size, color*, *flavor* and *condition.* 4 points.

BLACKBERRIES must be tested according as they present *size*, *color and form*, *flavor and texture*, and *condition.* 4 points.

In all cases it is well to have a convenient scale of comparison, for which the number ten is found to be easily managed. The highest figure denotes perfection for the variety, and five is mediocre, below that is condemnatory. The total of the marks should exceed fifty per cent of the possible number, or the entry must be passed as unworthy of award.

Digitized by Google

PROCEEDINGS

OF THE

FOURTEENTH ANNUAL MEETING

OF THE

IOWA STATE HORTICULTURAL SOCIETY,

HELD AT

DES MOINES, IOWA, JANUARY 20, 21 22 AND 23, 1880.

THE Iowa State Horticultural Society convened for its Fourteenth Annual Meeting, pursuant to adjournment and notice, in Sherman Hall, in the city of Des Moines, at 10 o'clock, January 20, 1880.

The meeting was called to order by the President, C. L. Watrous, of Des Moines, and opened by prayer by Hon. Suel Foster, of Muscatine.

PRESIDENT'S OPENING REMARKS.

Gentlemen of the Society—This year the pleasant duty falls to me of greeting and congratulating you that so many are able to meet here. Horticulturalists, preeminently a friendly folk, at our annual gatherings form friendships which are cemented year by year till our meetings are cherished reunions, and we feel emphatically that it is good to be here.

Digitized by Google

During the long year that drags between these meetings, we study our art mostly alone, being too busy and too poor to spend time in visiting. We come here expecting by counsel to have many of our doubts resolved, sure, at least, of that sympathy which is often as precious as help. We meet as students after a long vacation. To many of us these are about the only days we are able to spend from the labors of life to the pleasure of study. In these short, too short, days we recite the lessons of the experience of a year, and here we set to ourselves other tasks and other questions to be resolved if possible before we meet again. We have a rich programme before us, with papers reaching almost every nook and corner of our science. These papers will suggest discussion, which is the breath of the nostrils of progress. We want to hear from every one who has a pertinent fact, but to accomplish our work in the allotted time, we shall speak briefly and to the point, feeling our responsibility.

The session is now open for business.

The report of the treasurer was announced first in order:

Digitized by Google

TREASURER'S REPORT.

IOWA STATE HORTICULTURAL SOCIETY *in account with* H. STROHM, *Treasurer.*

1879.			
January	24.	By cash balance on hand	$ 1545 27
January	24.	Membership received at winter meeting	71 00
February	6.	Membership of Elwood Tatum	1 00
June	14.	Membership of E. D. Carlton	1 00
July	15.	By State appropriation for year ending April, 1879	1000 00
December	4.	By cash from J. L. Budd, refunded on Russian Cion appropriation	8 00
December	24.	Membership of F. K. Merriam (Maine)	1 00
1880.			
January	17.	By interest	45 00
		Total	$ 2672 27
		To amount paid out	1465 16
		Balance due society	$ 1207 11

AMOUNT PAID OUT.

1879.			
January	24.	To premiums paid on apples at winter meeting	$ 85 00
January	24.	Premium on Seedling Apples	10 00
January	24.	Premium on Winter Pears	5 00
January	24.	Premiums on Plants and Flowers	31 00

EXPENSES ATTENDING WINTER MEETING.

January	24.	Suel Foster, director	13 90
January	24.	J. N. Dixon, director	8 80
January	24.	G. H. Wright, director	25 10
January	24.	C. G. Patten, director	19 00
January	24.	J. Thatcher, director	15 30
January	24.	R. Speer, director	12 10
January	24.	A. J. Haviland, director	16 50
January	24.	L. G. Ireland, director	31 65
January	24.	G. W. Shaw, director	17 50
January	24.	C. L. Watrous, director	12 80

Digitized by Google

1879.			
January	24.	H. W. Lathrop	13 25
January	24.	H. Strohm	13 25
January	24.	J. L. Budd	9 65
January	24.	Chapin & Sower, printing programmes	3 00
January	24.	—— Bowler, janitor's fees	4 00
January	23.	H. W. Lathrop, postage and express charges	4 20
January	24.	J. L. Budd, office expenses	107 20
January	24.	J. L. Budd, Forestry expenses	31 60
January	24.	J. L. Budd, salary as Secretary	250 00
January	24.	J. L. Budd, Forestry salary	50 00
January	24.	J. L. Budd, on Russian Cions	39 91
January	24.	H. Strohm, salary as Treasurer	25 00
January	24.	G. H. Wright, Forestry premium	40 00
January	24.	Elwood Tatum, Forestry premium	20 00
1880.			
March	4.	To C. V. Riley, for Entomological cuts	15 00
April	18.	To R. P. Clarkson, for printing 500 extra reports	151 00
April	18.	R. P. Clarkson, printing Forestry Annual	121 25
April	18.	Express charges on Russian Cions	10 70
May	12.	To H. A. Perkins, for binding 500 copies State Horticultural Report	150 00
May	12.	Boxing and drayage	2 50
September	15.	To expenses of delegates to American Pomological Society	100 00
		Total	$ 1465 16

SUPPLEMENT TO TREASURER'S REPORT.

IOWA STATE HORTICULTURAL SOCIETY *in account with* H. STROHM, *Treasurer.*

		CREDIT.	
1880.			
January	23.	By cash balance on hand	$ 1207 11
January	23.	By membership at winter meeting at Des Moines	78 00
January	23.	Membership reported by Secretary	36 00
January	23.	Life membership	5 00
		Total	$ 1326 11
		Paid out	1088 91
			$ 237 20

AMOUNT PAID OUT AT JANUARY MEETING.

1880.			
January	23.	To premiums on apples	$ 85 00
January	23.	To premiums on Seedling Apples	15 00
January	23.	To premium on Plants and Flowers	33 00

Digitized by Google

EXPENSES ATTENDING WINTER MEETING.

1880.			
January	23.	To George W. Shaw, director	14 16
January	23.	To Suel Foster, director	17 05
January	23.	To L. G. Ireland, director	38 70
January	23.	To R. P. Speer, director	20 50
January	23.	To H. C. Raymond, director	12 70
January	23.	To George H. Wright, director	20 00
January	22.	To A. J. Haviland, director	15 00
January	23.	To Jonathan Thatcher, director	15 70
January	23.	To H. W. Lathrop, director	13 90
January	23.	To C. G. Patton, director	22 70
January	23.	To E. H. Calkins	18 00
January	23.	To G. B. Brackett	15 72
January	23.	To C. L. Watrous	11 25
January	23.	To J. L. Budd	16 55
January	23.	To J. N. Dixon	11 10
January	23.	To H. Strohm	15 35
January	23.	To H. W. Lathrop, balance expenses attending National Pomological Society	56 91
January	23.	To E. H. Calkins, balance expenses attending National Pomological Society	39 40
January	23.	To G. B. Brackett, freight and work on apple casts, etc.	10 37
January	23.	To H. Strohm, salary as Treasurer	25 00
January	23.	To J. L. Budd, salary as Secretary	250 00
January	23.	To J. L. Budd, office expenses, Forestry Annual, etc	213 00
January	23.	To A. Jann, assistance at hall	4 50
January	23.	To Wm. Lotz, use of tables	6 50
January	23.	To Charles Harbach, hall rent	60 00
January	23.	*State Register*, printing	10 25
January	23.	To Perkins & Co., use of plates	1 60
		Total	$ 1088 91

On motion the report of the Treasurer was referred to Finance Committee.

The report of the Director of the 12th District was now in order. This District is composed of the following counties: Winnebago, Hancock, Kossuth, Emmet, Palo Alto, Dickinson, Clay, Osceola and Lyon

Digitized by Google

REPORT OF DIRECTOR FROM TWELFTH DISTRICT.

BY L. G. IRELAND, OF SIBLEY, IOWA.

Mr. President and Members of the Horticultural Society—I greatly regret that I cannot report as gratifying results for the past year as I hoped to do at the close of my last report.

From August 1, 1878, to about May 12, 1879, I think the rainfall in western half of the twelfth district would not exceed one inch; from the latter date to close of the year, the rainfall was light, but evenly distributed, and on the whole very favorable. As given by Mr. M. J. Campbell, of Sibley, Osceola county, observer of Iowa Weather Service, the rainfall from January 1 to May 1 was but 0.41 inches; month of May, 3.89 inches; June, 3.60 inches; July, 2.33 inches; August, 1.87 inches; September, 2.99 inches; October, 1.46 inches; November, 0.68 inches; December, 0.65 inches; total for year 1879, 17.88 inches. Heavy wind storm May 4; hard freeze night of May 5 and 6. The snow-fall of winter 1878 and 1879 was about two inches, the ground not fairly covered at any time, and but few days that any snow was to be seen. This, with excessive drouth, was disastrous to all fall or spring planted trees of '78 and '79, and may partially account for loss of cottonwoods of all ages. This tree is fast losing its popularity on our high prairies, it not proving as satisfactory as was expected; thousands of them from one-half inch to six inches in diameter having succumbed to unfavorable circumstances the past year. No other tree suffered so severely as this. The black locust, which I have considered tenderest of about forty sorts growing on my own grounds, was killed back but very slightly. I cannot satisfactorily account for this failure of cottonwood. Some were killed outright, others would sprout from near the root. Some had one side of trunk killed, whilst the other retained vitality sufficient to support life in the branches, but generally these were broken by late summer and fall winds, nor was the dead line, as I expected to find it, always on the sunny-side of

Digitized by Google

the tree, it was often on the opposite side. I have been unable to discover that it was in any way caused by insect enemies, but attribute it to rapid growth, followed by excessive heat in summer of 1878.

Planting of forest trees has been general the past year in the twelfth district, stimulated by the very generous exemption laws of the Seventeenth General Assembly, in some counties reaching the number of 1,000,000, very many, however, replacing those killed in older plantations. Most of this planting was of cottonwoods, as a supply of other sorts could not be obtained. Willow, box elder, ash, elm, and walnut, are gaining favor. For a quick growth that will make a good wind-break, poles for fencing, etc., and for fuel, without reference to more valuable qualities, I conclude we have nothing of equal value with *white willow*. Mr. Fell has planted largely of willow at Larchwood, in Lyon county, and claims for it many more valuable qualities. I am of opinion that it would be well to *grow* more willow and *plant* less cottonwood, not neglecting such as are more valuable for other purposes. The walnut, ash, honey locust, red elm, etc., are assuredly hardy, good growers, and supply a want no soft-wooded tree can supply. Red cedar would be more extensively planted if trees could be obtained readily and cheaply.

Evergreens for the past year have given unusual satisfaction, notwithstanding drouth. We had come to regard Scotch pine as the only reliable evergreen with us, but balsam fir and Norway spruce, which had barely succeeded in keeping alive have, this year, made a good growth. I notice the Norway spruce planted along the cuts on the St. Paul and Sioux City Railroad making good growth the past year, although wholly without cultivation. I also notice a few white pine doing well, but these trees are heavily mulched, as all trees should be.

Our fruit, although promising well, was a total failure on account of heavy wind-storm and freeze noted above. All sorts of fruit trees were well set for fruit, but very few produced even a single specimen. Of standard apples, I do not know that the western half of the twelfth district produced a single specimen, and of crabs very few Plums and cherries ditto. Raspberries badly killed, very little fruit. Currants and gooseberries badly damaged by May freeze and high wind. Strawberries, partial crop.

We have, during the past year, been doubly convinced of the necessity of mulching, recommended in former reports, more especially for

Digitized by Google

late summer and fall. For overcoming the difficulty of spring frost, I have recommended, and shall practice, giving my trees and shrubs a heavy mulch late in winter, to retain frost and retard opening of buds.

I find all the trees recommended in our Northern list last year proving satisfactory, and some others seem to give equally good satisfaction. R. O. Munson, of Sibley, has an orchard of about 300 trees, two years planted; total loss, one tree broken down by unruly cattle. He obtained his trees of Charles Barnard, of Allamakee county; has besides those named in our list, the Alexander, St. Lawrence, and others. Mr. U. S. Lines, of Lyon county, has many of the recommended sorts, all doing well. He also has the "Trophy" (not yet fruiting and unknown to me), which he reports as so far one of the most satisfactory with him. He has four sorts of pears growing, and is confident of success with Flemish Beauty and Bartlett, but says "they must not be babyied too much."

Of plums, none so far satisfactory. My purple Damson, of which I have been very confident, sustained serious injury last winter, but was not properly mulched; fruit-buds and new wood killed. As usual, no Miner Plums on our trees. The De Soto, although not first-class in quality, I think, from texture of leaf and determinate habit of growth, most reliable with us, and would recommend its cultivation.

We have yet found no raspberry to equal the Mammoth Cluster; should be planted close in the row, or canes tied up to stake, to prevent breaking by wind. The seedling reported by me last year stood drouth, and cold of last winter, perfectly; is inclined to branch low down, avoiding difficulty experienced with Mammoth Cluster; fruit like Doolittle, except light in color.

Concord and Clinton grapes do well. Some of my Concord vines, uncovered last winter, sustained little or no damage, but would recommend covering in all cases.

Blackberries will fruit if well mulched and canes covered in winter. Mr. Lines, of Lyon county, is cultivating in this way both blackberry and the dewberry, with good success. The latter, in fruit, is far preferable to the blackberry, and is worthy of extensive cultivation, if Mr. Lines' method will insure a crop of this desirable fruit.

Our strawberries are of mixed sorts, Wilson's predominating. This fruit will give as much satisfaction for the outlay as any grown in the district, and more attention should be given them.

Our people are generally waking up to the subject of fruit-growing,

Digitized by Google

but I have the same old complaint, they have zeal but not requisite knowledge. They buy trees of tree-peddlers from Ohio, or anywhere else, if they carry pretty pictures or glass bottles of fruit, and a glib tongue. Many trees have been sold the past year by parties from Ohio to be planted in Northern Iowa. This will do much to discourage fruit-growing, as these trees will assuredly fail, and the loss will be much greater than mere cost of trees; but, so long as farmers love to be humbugged, so long can be found those who love to humbug them. However, many will plant from reliable home nurseries, and this will, in time, by comparing results, educate even those who now think they know the whole.

Of insect enemies, I have to report some damage from the American silk-worm and the cecropia moth. They were not very choice in their selection, attacking box elder, willow, and soft maple, as well as apple and plum trees; also, a leaf skeletonizer has done some damage to cottonwood. I also hear of canker-worms working on willows, in a few cases. So far as I have seen and can learn of, no other insect is doing damage.

Of what we have learned the past year I can say but little. This, however, is true: we have learned the need of much patience and perseverance. We have become convinced we are on the right road to final success. We place our trees, according to nature of the ground, from four to eight inches deeper in planting than they stood in the nursery, then mulch; and I think about all are agreed to keep the pruning-knife entirely away; and it is also the proper way to treat our grape vines. If inclined to throw out too many branches rub off the buds, on either tree or vine; but use the knife, if at all, very sparingly.

Although my report is of the order *doleful*, still there is hope for the twelfth district in the future. We have men of intelligence and perseverance, who are not discouraged by repeated failures, so long as partial success is attained; and, if we do not succeed in all we wish, much of good will result from their constant and unremitting efforts.

Digitized by Google

REPORT OF DIRECTOR FROM THE ELEVENTH DISTRICT.

BY C. G. PATTEN, CHARLES CITY, IOWA.

Mr. President and fellow members—It gives me pleasure to be able to report a marked improvement in the general sentiment upon the subject of fruit-growing in the eleventh district.

Five or six years ago, the saying, that "fruit cannot be grown in Northern Iowa," was, if I may use the term, orthodoxy. To-day, the saying is the rankest heresy, even among the most extreme skeptics of those years.

Mankind, in general, are too easily elated by their successes, or cast down by their failures; and fruit-growers do not appear to form an exception to this general rule.

So far as I have been able to learn, the varieties remain unchanged, with slight modifications in favor of this, or against that variety. For instance, the Red Astrachan is steadily growing in favor as the trees advance in age; while just the reverse is true of the Saxton. A like comparison will hold good between Plumb's Cider and the Haas; the latter loses favor by constant comparison with the former. The Walbridge is by far the most hardy long-keeping variety that we have, so far as we can judge from nursery trees, and from orchard trees eight years planted. The fruit has specked considerably for two years past, but none more than Talman Sweet or English Russet; even the Willow Twig rotted on my trees this year.

This specking and decaying was undoubtedly due to the extreme heat both before and after storing. The decay of the Walbridge was more in appearance than reality, as the fruit mostly remained sound and natural close up to the skin, while some other sorts became bitter, and decayed rapidly. The Wealthy also keeps with a small per centage of loss to the end of its season; this apple is losing none of its reputation in the northern part of the State; the bearing trees are generally top-grafted on the crab, and they are bearing most wonderfully. I have a tree so worked, not over two inches in the stem, that bore nearly three pecks of beautiful, even-sized fruit; and I saw several other trees, both in Floyd and Mitchell counties, that were alike heavily loaded.

Digitized by Google

Orchards on high land almost universally bore good crops; many of them being heavily loaded. Late frosts destroyed the apples and crabs on low lands, while the cherries generally escaped. Our home-grown fruits were the finest that have been seen in our market this year. The early apples were especially fine. The Oldenburgs were in great abundance; their large size and great beauty made them very attractive. As a cooking apple they were very popular; their sharp acid being just the tonic that the stomach demands at that season of the year. Too much cannot be said in praise of this apple; it was truly a gracious boon to the great northwest,—as hardy as a crab, wonderfully productive, magnificent fruit, free from blight or disease of any kind, this apple has done more to beget confidence and establish the fact that apples of large size can be grown all over the vast region referred to than all other apples combined.

J. B. Mitchell, of New Oregon, Howard county, speaks of it in the highest terms. He says it is the only perfect tree among the old varieties in that county, but thinks the Wealthy equal to it in hardiness; that it is not injured a particle by the mercury falling 38 degrees below zero, as it did on Christmas morning. He says the Early Richmond is the only cherry that does well, and that Flemish Beauty does best of all the pears; both succeeding best on clay soils. Of the Washington importation of Russians, he has fruited No. 558 and No. 979, both large apples, season about October 1st; No. 334, good sized, season August; No. 231, small; and No. 568 discarded as altogether too tender for that climate. The four varieties mentioned have borne at five years from the root-graft. Kentucky and Green Prolific strawberries have done best with him. He grows Doolittle, Seneca and Davidson's Thornless, and finds the Thornless is destitute of berries as well as thorns. He reports that blight was rather extensive; that the worst blighted trees that he ever saw were the Hyslops, but that Transcendents generally suffered most. Some of the Russians blighted badly. He believes that orchard trees should have three or four feet of trunk, and be cultivated for ten or twelve years the same as corn.

If I were to judge from apparent condition of the Duchess and Wolf River trees, two and three years old, since the severe cold of Christmas, I should decide that the latter is fully as hardy as the former. But there has been so much said and written about the Springer's seedlings, that I feel no little delicacy in referring to them. Of about one hundred varieties of American apples that I have tried,

Digitized by Google

I remember none that have proved more feeble and tender than the Wrightman, and I say this after five years' trial, with three distinct settings, and in different locations. Time spent with it is worse than wasted in Northern Iowa.

Rich's Greening is a little better, but should be planted with extreme caution in the northern half of the State.

Wate's Blush and May, the latter a long keeper, excepting the Wolf River, are the most vigorous and hardy. Wate and No. 220 of the Russian's blighted so persistently that I deem them unworthy of further trial.

In answer to an inquiry relative to the Miner Plum, Mr. G. Spaulding, of Osage, Mitchell county, writes: My Miner Plum trees were planted in 1873; in 1876 they bore a few plums; in 1877, two bushels; in 1878 the bloom was blighted by the late frosts; this year the six trees bore over ten bushels; two of the best trees, at least three bushels each; the trunk of the largest tree, one foot from the ground is twenty inches in circumference, and the diameter of the top is full twenty feet. These trees stand upon rich prairie soil, made still richer by generous culture for the first three years. So far as I can learn, in the northeastern part of the district, where the Miner and De Soto have been grown together for several years, the De Soto is preferred, being far more profitable for six or seven years after planting. It ripens earlier, is nearly a free-stone, and a sweeter and better plum to eat from the hand. It and a native plum that fruited with me this year are the best that I have ever seen in this district, except the Lombard, and the native plum almost equal to that in size and quality.

SHADING ORCHARD TREES.

It will be remembered that February, 1877, was extremely warm. That month my orchard sustained more injury than from all the cold for the last ten years. The south sides of the trees were thawed out, day after day, and often suddenly frozen night after night. The principal injury was done to the forks upon the south and southwest sides of the trees. This "sun scald" as we term it, I have seen wherever I have been in the northern part of the State, and the severe injury that I had sustained, led me to adopt the plan of growing "fodder-corn" to protect them. I sow it thick so that it will grow from three to five feet high, and cut it about the time it should be cut for fodder, tie it in convenient bundles and shock it near where it is to be used.

Digitized by Google

Late in the fall, or on mild days during the first half of winter, I put it on to the south and southwest sides of the trees. The tops of the stalks or leaves, are pushed into the main forks, and the stalks drawn down the body and tied with a band as readily as one would bind a sheaf of grain. The soft pliant nature of the leaves admit of their being crowded into any sharp fork of the main limbs, or wherever it is needed, where, unless in unsheltered orchards, it will generally remain without tying. The wide blades afford a large degree of shade for the amount of material used. This shading is left on until spring has fully come, when it is taken off and thrown upon the ground. I think the bands might be left on until the time to take them off and burn them for the destruction of the codling moth, when new bands of the same material might be put on and gathered and burned in like manner. Or if a tree is considerably injured the protection may be left on the entire season, which will greatly assist in restoring the debilitated condition of the tree upon that side, and protect the newly forming bark from injury. I know of no tree that is so hardy that it would not be benefited by this protection, in very many locations, from the time it is from two to ten inches in diameter, and for varieties like the Sweet June and Saxton, that are only half-hardy, and subject to this "scalding" of the body, some such shading is indispensable.

In comparing orchards of like varieties, on lime rock soils, where the rock comes near the surface, with those on moist rolling prairie, or on deep dry prairie, I can discover but little difference in the value of either soil, for the production of good orchards. One thing however I have noticed, and that is, that these *best* and most *productive* orchards, are all shielded, either naturally or artificially, from the full sweep of the west and northwest winds.

Orchards in grass, that have been well mulched and manured, have done well, better in clover than in timothy sod, but judging from a limited experience, those that have been partly in grass, but cultivated between the rows in the early part of the season, have, and I believe will do best. No orchard with clean culture is safe for a single year in Northern Iowa unless it stands upon better roots than our American, or south of Europe, apples furnish.

One of my townsmen, Mr. Clinton Lee, informs me that his trees were badly infested with, and destroyed by, the borers, and that he dug out the old ones and about the first of June washed the bodies with a strong wash made of common sulphur. For two years they were so

Digitized by Google

treated, and they were entirely exempt from their attacks, and that the past year he neglected to so wash his trees, and they were filled again with borers. If this wash proves as effectual as Mr. Lee believes it will, the lime and sulphur wash hereafter spoken of will answer the double purpose of protection against the borers and blight.

My experience in root- and top-grafting on the crab has undergone no material change since my report of last year. The Perry Russet, eight years grafted on crab roots, are as large and vigorous as trees of other varieties on the common root. No single stock will, I think, perfectly supply the wants of every variety.

I am still compelled to report the English Morello cherry a failure. The Early Richmond is steadily gaining friends. Thomas Wardall, of Mitchell county, has trees eight years planted, small two-year trees at planting, that bore two bushels this year.

George Mitchell, of Floyd county, has a number of trees that have borne quite as well. According to the authorities the soil for the cherry is a dry one, but Mr. Wardall's trees stand upon land that is really moist, and rarely dry. It is so moist that it is with great difficulty that he grows the usual garden vegetables, and to this date has not been able to grow and ripen the Concord grape. He is within a few miles of the north line of the State, on a large level prairie that is underlaid with clay. For two years past his cherries have borne fine crops, while his apples and crabs have been cut off by the frosts, and the trees are suffering severely from blight, but the cherries seem vigorous and healthy. Mr. Wardall is a strong advocate of low tops—trees branching from the ground, little or no trimming, especially for the cherry, and I am sure that I have never seen trees of the same age with so large a bearing surface as his.

BLIGHT.

There can be no doubt that this mysterious enemy to horticulture is on the increase. Nearly every condition that has been supposed to be a sure safeguard against the attacks of this disease have utterly failed. Trees on land that was plowed reasonably early and allowed to grow up to the rankest growth of fox-tail and weeds have suffered badly. On high lands, in clover, and on high, dry, cultivated lands, that are swept by the winds from every direction, I have noticed the trees about equally blighted. On the most favorable aspects for exemption from blight trees, shaded on the south by dense evergreens, or other shrubbery clear up to their limbs, have blighted.

Digitized by Google

The experiment referred to last year, where the trees were whitewashed, was not repeated this year, and the trees commenced to blight again.

I used a lime and sulphur wash on my crab trees, and have but little blight. But this proves nothing on my grounds, as it has never hit my trees, only a little here and there, but sufficiently to convince me that a more extended acquaintance would not be desirable.

I have had a correspondence upon this subject with Mr. E. B. Jordan, of Rochester, Minnesota. He says: "I have suffered with the blight in common with this whole country, until I commenced washing and dusting with lime and sulphur. Since then I have had no blight, to damage. I do not know of a yard in all these parts where two trees were growing, except mine, that escaped the blight this year."

About the first of June he takes good rock lime, ¼ bushel to 1000 small trees; when it begins to slacken he adds one-fourth the amount of sulphur, and is very careful not to allow the lime to burn while slacking. If it should burn it will wash off the trees the first shower. He makes this wash about like thick paint, and washes the body and main limbs as far up as possible, and allows it to run into the opening around the foot of the tree. If the blight has commenced, he takes a tin duster with a long handle and dusts the blighted tree with a powdered mixture of the lime and sulphur.

I have a communication from T. J. Pitts, of Chickasaw county, which I will ask to have made a part of my report.

C. G. PATTEN, ESQ., *Director of Eleventh District:*

Dear Sir—In answer to your request for my list of best bearing and most hardy fruits, etc., of the past year, allow me to say that the promises in bud and blossom were all the most ardent admirer of fruit could wish. But the late frost and freeze of May entirely blasted the blossoms of some varieties, and greatly thinned all others. Still, my apples were a far better crop than ever before, but a very light crop to what it would have been but for the freeze.

Crab-apples—Less than one-half crop. Still there were enough, for with the plenty of the larger and better apples, there will be but few used at home, and but slow sale and poor prices in market.

Pears—All blasted by the frosts.

Cherries—About one-fifth crop.

Plums—But few escaped.

Strawberries—An abundant crop. Never better. Seldom as good.

Digitized by Google

The apple trees bearing best have been: Duchess, Gros Pomier, Fameuse, Plumb's Cider, Ben Davis, Talman Sweet, Tetofsky, English Golden Russet, Sops of Wine, Dyer, Saxton, and Rawle's Janet. Those most hardy in nursery and orchard that are bearing are: Duchess, Tetofsky, Red Astrachan, Alexander, Gros Pomier, Plumb's Cider, St. Lawrence, Walbridge, English Golden Russet, Paradise Winter Sweet. Those nearly as hardy as orchard trees are: Fameuse, Talman Sweet, Ben Davis, Dyer, Saxton, Sops of Wine, Rawle's Janet, Sweet June, and Grimes' Golden.

Tetofsky is our earliest apple; bears early and freely; fruit nearly as large and quite as good as the Duchess, and comes to maturity some two weeks earlier than that variety. The trees need a rich soil and liberal culture to insure fruitfulness. The same is true of Red Astrachan, Alexander, and most of the Russian varieties.

I am now manuring most of my orchard, as trees treated to manure, lime and ashes two years ago have improved greatly in appearance and fruitfulness. I have had no top-blight, not even a Transcendent blighting in orchard or nursery. Have had a trifle of twig-blight; likewise of body-blight and sap-scald, caused, as you may know, by neglect. With culture and care, and a liberal use of ashes and lime, this need not have occurred. Washing trees with thin soft soap and strong copperas water, or applying a wash of lime and sulphur about the first or middle of April, and again in June, is a very great help in keeping trees in health, and destroying the eggs of insects. These washes I apply with old style splint brooms, made during the winter of young hickory, with brush about ten to twelve inches and handle about three feet long.

As for pears, I am quite encouraged to increased efforts, and am flattered with the prospects of some fruit again another season on my Flemish Beauty, Buffum and Sheldon; a half dozen trees blossomed quite full this last season, but were killed by frost. My Early Richmond cherries are so much better than the other two varieties that I am satisfied with the Richmond, but prefer it on the Morello stock. Of plums, the Miner, Wild Goose, and a seedling of my own raising, are all that have borne much as yet. The Lombard, budded at the ground on native stock, bids fair to be hardy and productive. I esteem my seedling best as an early, and Miner as a late plum. There are three to four weeks difference in the ripening of these varieties. The Concord is my main crop of grapes, not from its being the best of all,

Digitized by Google

or the most easily raised, but from its being most widely known, and popularly supposed to be the best. Delaware, the most delicate and luscious of grapes, does well when well established on rich, well drained soil, and well cultivated. The same is true of the Martha. Rogers, No. 3, 4, 9 and 15, are as fine in vine, as hardy and productive, and of better quality of fruit than Concord, and a few days earlier. Dracut's Amber is ten days earlier; fruit of good quality; very productive, and keeps well. Champion, three weeks earlier than Concord; equally as hardy; very productive; fruit of medium size, fair quality, and keeps well. I have several newer varieties that promise well, that are not fruiting yet.

Out of over some forty varieties of strawberries tried during the past ten years, the Wilson, Downer and Green Prolific have given by far the best satisfaction. The last two years I have had on trial some twenty of the newer varieties, some of which bid fair to take the place of the older varieties. Foremost of these, I place Red Jacket, Crescent Seedling, Cumberland Triumph, Captain Jack, Monarch of the West, Prouty and Great American. Crescent Seedling and Red Jacket have done splendidly with me the past season. My plants were set on soil well enriched the season before setting; Crescent occupying rows between Wilson and Red Jacket. They were given clean, but shallow culture, and were treated to two slight dressings of salt during the season. The result was a grand surprise of the most abundant yield of the largest and most beautiful fruit I ever saw. Not that the salt made all this difference, for other conditions were favorable; perhaps other varieties under like treatment and conditions would give still better results. I shall try to ascertain. I am satisfied that Crescent yields much better when set near Wilson, or, as I have them, between Wilson and Red Jacket.

After fifteen years' experience in this county in handling and growing evergreens, I am surprised and amused to see people still so fearful of losses, so undecided what varieties to plant for ornament or for sheltering purposes, or whether either will do for groves and timber growing. It seems to me that with such a wide range of varieties, sold at such very low prices, that, with an eye to the natural selection of soil and situation, one might find varieties to suit every farmer in all this broad, bleak northwest with evergreens for ornamenting his front yard and for shelter belts to his farm house, barn, cattle yards, garden, orchard and growing crops. And of evergreens for groves and

Digitized by Google

timber-growing, I would very much like to write more, but have already spun this letter out too long.

Yours very truly, T. J. PITTS,
Nashua, Chickasaw Co., Iowa.

DISCUSSION ON REPORT.

J. N. Dixon: This theory of a lime and sulphur wash as a preventative of blight, I have some faith in, but I wish to disclaim all belief in it as a specific only so far as the light color of the wash may lower the internal temperature of the tree. Any conditions of situation, or soil covering, favorable to lowering the temperature of the soil and lower beds of air during the intense heat of our summers, I have noted are favorable to health of the trees and their exemption from blight.

Suel Foster: I have not been much troubled with blight on my grounds on the light colored bluff soils at Muscatine. I have had some blight on very thin soils where the trees were making very slow growth. The willow has been most affected. I have washed some of my trees with the lime and sulphur, but as yet I have noted no special benefit from the practice. But farther trial will be needed before deciding, as the blight is not yet general enough on our soil to enable us to decide that a tree is or is not benefited by any special treatment. My trees have not done well in grass. Where culture has been given the trees have been most vigorous, and have grown the best crops of salable fruit. My pear trees have suffered badly with the blight during the past two years. I feel at this time more discouraged than ever before with attempts at pear growing. I have some faith that the whitewash and sulphur will be beneficial if continued for a series of years.

Mr. Dixon: I would like to ask Mr. Foster if he noted any difference in tendency of trees to blight on different soils and exposures?

Mr. Foster: My pear trees seem to blight in all situations. With apples I have not much blight anyway. The crabs blight quite badly. I have never noticed any blight on the Virginia crab.

The report of standing committee on Orchard Management for the Southern District was now announced in order.

Digitized by Google

ORCHARD MANAGEMENT AND VARIETIES.

E. H. CALKINS, BURLINGTON.

When we reflect that the production of an apple orchard requires assiduous care for a half score of years on the part of the planter, and that any mistakes in the selection of varieties, or in the manner of training his trees, must remain mistakes to the end, it will become apparent that no idle whims should be catered to, nor advice given, without the writer well knowing what he utters to be the truth.

With this fact before us, and knowing further that this subject has been treated on of late by far abler pens than now employed, it is with some degree of diffidence that the following effusion is launched forth upon the public, rendered the more so by the knowledge that a wide difference of opinion exists as to the best methods to be employed in the formation of an orchard, and still wider in the selection of varieties to compose it.

In the selection of an orchard site, land should be chosen that has good drainage and as good elevation as the circumstances surrounding will permit, and if possible in this connection a soil that has no tendency to "bake," nor that is underlaid with a "hard-pan" subsoil to hold the superabundant water in rainy periods. It is nearly as fatal to an apple tree to stand in a water-logged soil as for a man to stand continuously for a long time with wet feet. This should be studiously avoided. After the selection of the site, next in importance is the selection of the trees to plant. The worst policy for a man to pursue in this, would be to order the trees from some traveling vendor of whom he knows nothing and who can give no other guaranty than his personal "warranty" that they are true to name, and the further pledge to replace with others that failed to grow.

The next worse piece of folly would be to buy because they were *cheap,* a lot of poorly grown, scrubby trees, a large number of which have forked near the ground into several branches, under the mistaken idea that trees of this form are necessary for training into his ideal low-heads. Better, instead, go to the nursery of some *reliable* and *responsible* man to get your trees, one who has a reputation to sustain

Digitized by Google

dear to him "as the apple of his eye," and *with his aid,* unless you are familiar with the habits of the various sorts you wish to plant, make your selections, *always* from thrifty young trees, two years old to be preferred, no matter *who* may say to you "get *large* trees so as to get the better worth of your money." The young tree will receive comparatively little shock by the removal, and will transplant with but a small percentage of the risk attending the removal and transplanting of the large one. By no means buy orchard trees because of their *cheapness.* Generally such purchases are dear. The intelligent nurseryman who puts his brains into his business, and bestows much care in forming his trees into comely shapes, carefully lopping off, when small, such branches as will mar the future usefulness and beauty of their after-life, knows their superiority over those negligently grown and ugly in shape, and most likely asks more for them. (Nurserymen have not yet advanced into the angelic state—sorry for it. They are only human.) Better by far pay double price for trees first class in quality than accept an inferior quality as a gift.

The true type of a nursery tree to grow into good form and withstand the varying vicissitudes of wind and storm, heavy fruiting, and any casualty that may befall it, is a central stem having *no forked branches,* but throwing out side branches evenly from the central shoot. This form of tree, if taken from the nursery at about two, and not more than three, years' growth, which will be before it has grown inordinately tall from being crowded, and the lower limbs stunted in growth, may be trained into a *low* top if desired, and thus avoid the evils of splitting down, which is almost certain to occur at some stage of growth if trees with forked branches are used. Or they may be trained into any height of top desired. My own preference is to leave most of the side branches on that are two feet and upward from the ground, shortening in such branches as have a sturdy growth to a few buds; *if low,* the only office they are to perform being to partially shade the trunk with their foliage while the tree is young; thus preventing a too rapid evaporation of the juices of the tree until it gets well established in growth. My own preference in height of trunk is about four feet for trees that have a moderately upward growth of limb, and the height increased for such as have a drooping tendency, in order that a small team may be driven under the branches when it is desirable to use the plow in the orchard. It is not always necessary to arbitrarily fix the height of top at first. The lower limbs may be

Digitized by Google

cut away from time to time as occasion may seem to require, until the desired height has been obtained; yet such cutting away should be done before the limbs to be removed have grown to such size as to make an ugly wound to heal over. If the pruning of the top is promptly and intelligently done no limb will ever need be cut out after it has attained much size. For such pruning no set time is required, but every limb, as it develops enough to show that it will chafe another, should be cut away as soon as discovered, also every twig which, if left to grow, would cause the top to become heavier on one side than another. The tendency of a large proportion of trees planted to lean toward the northeast being apparent, due reference at times of pruning should be had to this accepted fact, and be on the alert to shorten in the limbs on the leaning side, and encourage growth as much as possible on the side *from which* it leans. Thus an erect growing tree may often be obtained from one, the natural tendency of which would be to grow to one side.

The distance apart at which orchard trees should be planted to produce the best results is perhaps an open question—some trees with a spreading habit requiring more space than others of a more upright growth. In the same orchard it is hardly practical to plant at different distances to accommodate the wider and narrower growths, therefore a *mean* distance is usually adopted. My preference is about 27 feet apart, which will admit seven rows of corn 3 feet 10 inches wide between the rows. A modified form sometimes adopted is to lay off the ground into rows nineteen feet apart. This may be done by staking off the ground where the rows will come, and with a team and plow throw the earth *from* where the row will be, leaving a bed-furrow where the trees are to be placed. In the two outside rows set stakes nineteen feet apart, to use as guides in planting the trees. Plant the first tree at the first intersection of the line of stakes with the furrows prepared for the tree rows, and at each *alternate* intersection *thereafter* throughout the row. Begin the row next to it by *omitting* the first intersection and plant in the *second*, and in each alternate one afterward till the row is complete. Begin the third row the same as the first, and keep up the same alternation through the orchard. Supposing the orchard to be planted to range with the points of the compass, the rows north and south, also east and west, will be nineteen feet distant, and on the diagonal lines—NE. by SW. and NW. by SE.—a fraction over twenty-six feet. The rows with the cardinal points of the compass will allow five corn rows between them, which will be a convenience at

Digitized by Google

time of gathering, and will be no small advantage. The trees will stand thirty-eight feet apart in the rows, which will allow the occupancy of the ground until the orchard trees attain a size demanding the whole room by an equal number of *temporary* trees should this be desired; such as peach trees, or some early-bearing kind of apple that might be removed when the permanent trees require all the room. An additional advantage will be found in the trees getting the rays of the sun earlier in the morning and receiving them later in the evening than if planted in the squares of twenty-seven feet. It must be borne in mind that the northeasterly side of a tree gets sunshine only early in the morning, and the northwesterly side in the evening. The trees on this plan would be, east and west, also north and south, thirty-eight feet distant.

It must be apparent that the sun-rays must strike the tree earlier than if a tree stood within twenty-seven feet on the east side, and the same might be said of the evening sun and west side.

In this connection I would say I have an orchard planted in this way, on a part of which are upwards of a hundred bearing peach trees which have in no way interfered with the apple orchard, but which in time must be removed. The effect of the early and late sunshine on the fruit while growing, and especially when approaching maturity is plainly visible. While not recommending this plan of planting to others, I expect to repeat it myself when setting out another orchard.

For a number of years, and until orchard trees attain to a size to prevent a crop being grown, I know of no better treatment of a young orchard than planting annually to corn, which in my opinion, should never be cut and put into shock. The late growth of the corn checks to a great extent the late growth of the trees, thus compelling them to stop *their* growth and mature the wood. The dead stalks protect the young trees from the fierceness of the winter winds, also to a great extent shade them in the winter from the direct rays of the sun at the same time that great damage results from sun-scald. The stalks also are needed to be returned to the soil to help keep up the fertility.

"Eternal vigilance" is necessary to be kept up during the growth of the young trees against noxious insects and vermin, particularly borers. The orchard needs going over frequently and all useless twigs removed, as well as all that would be ultimately harmful. The height of top—if it is desired it should be moderately high, should be carefully looked after and be formed gradually—owing to the tendency of

Digitized by Google

the trees to form the lower branches light or heavy; if heavy they should be removed sooner.

(Allow me to say parenthetically that I shall try to induce no man to form the heads of his orchard trees high if he has a preference for low tops; but I want *my* trees high enough to admit a small sized team to pass under the branches to facilitate an occasional plowing which is indispensable to the well-being of any orchards, at least in *this* portion of the State.)

As "Doctors often differ," so will orchardists as to the *best* method of management for an orchard after cropping with grain has ceased. My own plan is to seed to clover and allow pigs to pasture on the land until it is necessary to save the fruit which falls, when they are removed. It is a fact beyond question that they destroy immense numbers of the codling moth, and thus lessen the ravages of this terrible pest.

It is presumed to be needless to add that an orchard, especially while young, would be a very unsuitable place for a feeding ground for full grown bovines, or for an occasional practice with their horns. While it might contribute to the temporary enjoyment of the animals, it would be no benefit to the trees. They, as well as all other farm stock, except the pig, should be rigidly excluded, and the pig should be well rung before he is presented with a "complimentary" to the inclosure.

Our home plan of gathering apples, except from quite young trees, is as follows:

We procure some light muslin, yard wide; cut into pieces seventeen feet fong, and sew four breadths together. At the ends make a hem wide enough to insert a piece of "edging" one and a half inches wide, sawn from an inch board. This will form a "sheet" sixteen and a-half feet long and twelve feet wide, which is held under the tree by a man at each end, with the side next to the tree tilted down enough to allow the apples to roll off to the ground as soon as they strike the sheet. Much labor may be saved by this method over hand-picking, and scarcely an apple will be bruised while shaking the outer limbs. The fruit in the top of the tree directly over the trunk, should be picked to prevent bruising.

The subject of varieties of fruit to compose an orchard is one that requires much thought and a comprehensive knowledge of the subject to enable the adviser to speak intelligently. The great variation in soils to be suited with trees, and the almost imperious requisites some demand to succeed well, need to be carefully considered. It is well

Digitized by Google

known that Winesap trees on thin clay soil, underlaid by hard-pan, ordinarily fail to produce enough fruit to repay the outlay of labor and land they have cost; while on soil rich, deep and porous, where the roots, which are few in number, may, with no obstruction, strike, as is their habit, deep into the soil, and find ample sustenance, they are among the most profitable varieties grown. The Yellow Bellflower, on the contrary, if grown on deep, rich soil, will fail to "bring forth much fruit"; its whole energy being devoted to making growth of wood. It often succeeds remarkably well, however, on soils quite the reverse, and where Winesap would entirely fail. The requisite character of soil for numerous other varieties must be provided to have the orchard prove a decided success.

The orchard is grown for two purposes: fruit for the family and for the market. The fruit-grower who has a special fondness for the peculiar flavor and excellence of any given variety, esteems such so highly that it is considered worthy of a place in his orchard, even though it give him but a light annual return in fruit; while for market purposes it would scarcely be worth the room it would occupy.

To a considerable extent, and particularly for the frontier markets, two main requisites to command high prices, are large size and deep red color; many purchasers selecting their apples upon the same principle that an Indian woman does her calico—a flashy color being the dominant feature sought. The "color line" is very sharply defined, often at the expense of more valuable qualities, in making purchases for markets *very remote from the place of production.* A review of the St. Louis market will generally show Ben Davis standing at the head of the list in price, and yet that must not be accepted as the verdict of St. Louis people. That variety is almost invariably shipped away from there to the far south and southwest, and it is because of its shipping value that it bears so high price.

There yet remains a large number of people to be provided for, who do not believe that "gaudy plumage" necessarily "covers a fine bird;" and who choose their supply of fruits with reference to their fine qualities, irrespective of their colors. To such persons many of the old sorts of well known excellence, though clothed in plain colors, are preferred to others more highly garnished but lacking in quality, and who, in any event, would buy but sparingly of Ben Davis or any red variety of similar quality. Therefore, every grower of fruit who wishes to supply his local market, will be asked for Yellow Bellflower,

Digitized by Google

Roman Stem, White Winter Pearmain, Peck's Pleasant, Swaar, and, chief of all, the real "king" of apples, Grimes' Golden—all of which are of pale color. So, that while mainly it may be *policy* to drift with the current, and produce the fruit with the ruddy cheek for the bulk of the crop, there yet remain other demands to be met; some fruits must be grown for their excellent quality in order to meet the wants of some purchasers. To a considerable extent in our home market, our Jonathan and Grimes' Golden, or any other sort of equal merit, will command a much higher price than Ben Davis; and, in a year of plenty, when the price ordinarily runs low and the fruit of highest quality not plentiful, the difference will be increased to double or triple the value of the latter. In support of this assertion, the writer would refer to his own experience in the fall of 1878, when the common varieties of fruit were sold in the city of Burlington at forty cents per bushel, *the maximum price*, $3 per barrel were obtained for Mother and $3.25 for Grimes' Golden, and the demand for them far above the ability to supply.

One other fact I wish to refer to in this connection. The autumn of 1878, in Des Moines county, was more prolific in fruit supply than any that had preceded it and prices of our common fruits ran very low. Dealers bought in the crop at prices ranging from 75 cents, the minimum, to $1.00, the maximum, per barrel measure. These apples were hurried out of the country as soon as they could be disposed of at a profit, and the same men *immediately* imported a better grade of fruit in car loads from Ohio, New York and Michigan, to supply the wants of the Burlington people, which they sold at prices ranging from $2.75 to $3.50 per barrel, owing to the real value of each.

Among those brought from abroad were no Ben Davis, Rawle's Janet, nor any other low quality fruit. They were mainly Baldwin, Esopus Spitzenburg, Rhode Island Greening, Westfield Seek-no-farther, Golden Russet, Swaar, Northern Spy, Wagner, White Pippin, King of Tompkins County, Canada Red, Dominie, and perhaps a few each of some other sorts. Thus while Iowa growers sold the bulk of their fruit to be sent away, at a low price, the home market readily paid a high price for a better quality.

These facts must be heeded and these wants for high quality of fruit must be met—if not by *Iowa growers* then by the next nearest neighbor who has the stock demanded. And while I do not, nor never have condemned the growing of Ben Davis, I do appeal again to Iowa fruit growers, while growing that sort largely, not to forget that others

Digitized by Google

too must be grown even though less bushels may be obtained from a given number of trees, if we would supply our own home markets.

My belief is, that taking a series of years, as many bushels of Grimes' Golden may be produced from a given area of ground as of Ben Davis, as the former is a more uniform bearer. The same may be said of Dominie, and I would almost be willing to include with them White Pippin, all of them fruits of a high degree of excellence, and have hosts of friends wherever known.

So far as the demand exists for a high quality of fruit at a maximum price over a low quality at a minimum price, that demand should promptly be met. And more than that, it should be the aim of the intelligent fruit culturist to gradually but surely raise the standard of taste of the purchasers of his fruit to a higher plane. This he can do by producing a high quality of fruit, and carefully calling the attention of purchasers to their superior merits. These remarks are intended to apply particularly to home markets where the grower and consumer meet and are usually mutually acquainted.

DISCUSSION ON REPORT.

Suel Foster: We have been forced to market our apples early the past season, as the excessive heat of autumn ripened the fruit prematurely. Our people are not as anxious to import fruit from Michigan as formerly. We can grow as good fruit as can be grown anywhere at the East. Our Jonathan, Grimes' Golden, Dominie, etc., are difficult for our Michigan friends to excel.

Mr. Patten, Floyd county: Some of our members are inclined to urge that by top grafting on hardy stocks we can grow such sorts as Grimes' Golden at the north. It is true that the tops will sometimes endure our phases of climate for a number of years, and we may get a few specimens of fruit, but where we get single specimens of such sorts we can grow bushels of hardier sorts like Ben Davis, when worked in the same way. I say, worked in same way, as the Ben Davis is not hardy with us when root-grafted. The Pewaukee I think will prove profitable with us top worked. It is a large sized and salable variety.

E. H. Calkins: I have some Grimes' Golden, top-worked on Rawle's Janet, which have taught me an apparent lesson as to the influence of scion on stock. Only a portion of the Janet trees were top-worked, and all of these are healthy and profitable. The Janets not top-worked

Digitized by Google

are either entirely dead, or in unsound condition. The first crops of Grimes' Golden were rather light and inclined to premature dropping, but as the trees attain age they bear fine crops and hold their fruit better.

Mr. Foster: The report recommends alternate planting of the trees in the rows on what is known as the quincunx plan. I do not favor this mode of planting. It is difficult or impossible to drive a wagon through the orchard only one way, after the trees attain bearing size. Aside from the inconvenience I see no gain in the plan as the roots need all the space between the rows for their extension, and I have noticed but little difference as to the exposure of the leaves and fruit to the breeze and the sun.

Mr. Thatcher, Van Buren county: It has been said that Grimes' Golden is shy in its habits of bearing. With me it is rather inclined to over-bear. I find, however, that it sticks to the old habit of premature dropping of the fruit. I now pick it early and find no loss in so doing, I have some trees top-worked on Talman Sweet, which hold the fruit much better

Mr. Calkins: I have picked Grimes' Golden on the 15th of August, and had them keep well. Jonathan and Northern Spy, I also find it profitable to pick early. If they perfectly ripen on the trees they become fall varieties, especially when our autumns are unusually warm.

ORCHARD MANAGEMENT AND VARIETIES FOR THE CENTRAL DISTRICT.

BY J. WRAGG, WAUKEE, DALLAS COUNTY.

Mr. President and fellow members—Somewhat reluctantly I take Mr. Whitman's place in report on orchard management and varieties for Central District, not but that I should be glad to contribute in any way I can to the "good cause," but I had hoped to listen to an in-

Digitized by Google

structive report from Mr. Whitman and feel that many besides myself will be disappointed.

The first thing to be considered in planting an orchard is location. "Where shall I plant my orchard that it may be a success?" is the question that presents itself to the intelligent tree planter. The average farmer is too apt to look at it in this way: My house is built, my site for barn, cattle yards, hog lots, etc., is located, and there is just one place to plant my orchard, *and there it must go.* The intelligent planter will select the site for his orchard, that he expects in the years to come will pour out its treasure of "crimson and gold" for him and his children, with as much care as he does his stock yards, with an eye to the future good and comfort of his animals, for like them his trees will not like to have their "feet wet." As to slope, "who shall decide when Doctors disagree?" and while I know of good orchards on a north slope, my own preference is for south and east. In my immediate neighborhood is an old orchard, planted and, much of it, grafted by the same hands; it is planted on top and both sides of a ridge running northeast. The top and southeast side is one hundred per cent better than the northwest side, both in vigor of tree and productiveness. But candidly, I think there is not a hill top or slope in any direction, in any one of a dozen counties around the Capital City, on which a productive orchard may not be grown, with ordinary care and judgment. One thing is indispensable, thorough drainage, either natural or artificial. To any one who thinks that any ordinary soil is dry enough to grow trees, I would say go and examine the orchard and nursery of Judge Lewis, at Winterset, where may be found most of the trees grown in this latitude: Fruit and ornamental shrubs, vines, etc., and then say if ever you saw trees and plants in better condition or making better growth, and it is the most thoroughly drained place I know of.

Now, what aged tree shall we plant? I have planted trees from one to six years old; prefer two years, all things considered. You get good roots and in ten years your trees will be as large as if they had been older when planted. Don't be afraid of digging a big hole, and when it is finished let the bottom be the shape of a saucer; *but now mind*, let the saucer you have in your "mind's eye" be an *inverted one* so that the roots of your tree may be in a natural position. Common sense dictates that in transplanting trees we give them all the chance to grow possible, for at this time more than any other, our tree has to

Digitized by Google

depend on its own resources. After being well planted, the next thing is to keep plenty of moisture in the ground to promote growth, in case the spring should be very dry, which is often the case. This is best attained by liberal mulching with half decayed hay or straw. Now is the time to plan the future shape of your tree; the knife will hurt less now than it will in ten years; hence settle in your mind how high you want the trunk and work to that. If your trees are small and you cannot do it all the first year, do what you can, and remember that eternal vigilance is the price of good trees; as they grow older they will need judicious pruning. In the removal of branches that you see will interfere in the future let the tops be well balanced, or if anything the heaviest on the south or southwest side. It is best to cultivate a young orchard till it is eight or ten years old, then seed down with grass—clover is best, though timothy or herds-grass will do, as it does not make a tough sod on prairie soil. I have in my mind now a fine young orchard laid down with blue grass, for some years and doing finely as yet, but do not advise the plan, and mulching an orchard of any age I consider an advantage. One of the finest crops of winter apples raised the past year in this District, was that of Mr. Hargis, near Des Moines, a very rank and dense growth of grass in 1878, was not cut but allowed to fall down, thus making a thick mulch over the entire surface of the orchard. The old theory that our rich prairie soil needs no manure does not seem to hold out in practice. In my own vicinity within the last few years the best results have followed a liberal application of manure. It is not only a new source from which the tree may and does draw nourishment, but also acts as a mulch.

HIGH OR LOW TOPS.

"My voice is still for war" against the low top theory. I see nothing in it to praise (except that it saves the nurseryman and orchardist some work), and much to condemn. True, you can stand on the ground and pick some of your apples; you can also lie down and pick some if you choose; but what are such apples good for. I venture to say that no one with a cultivated taste would select a low grown apple to eat, except from quite young trees. When trees have been allowed to form low heads the fruit on the lower branches (when there is any), will be uncolored and tasteless; except in rare cases a low headed tree will be a poor tree before it attains much age; as friend Foster well says, every branch tries to become a trunk. No variety that I am acquainted with but what, if allowed to fork near the ground will grow

Digitized by Google

so close and enclose so much bark between the forks as will eventually injure the tree, while the next tree, though of the same variety, if not allowed to branch lower than four feet will send out its branches at such an angle as will prevent its being split off by the wind or its own weight. No exact rule need be followed, as our knowledge of the habits of different varieties will teach us that while a Wine Sap, Willow Twig or other drooping sorts need to be headed well up, erect growing kinds may be allowed to branch out somewhat lower.

"THE ADAPTATION OF VARIETIES TO SPECIAL SOILS."

Of this I can say but little that is worth saying. I find the orchardist who is located on high, dry, rolling ground, is the one who is partial to Winesaps, and Willow. Winesap is not a success with me; while among the varieties that will not only *live*, but do well on a moist soil, I may name the Ben Davis, Jonathan, Rawle's Janet, Roman Stem, and Duchess.

ROOT AND TOP-GRAFTING.

After quite extended observation in my county, and careful inquiry of our best orchardists, I find that in the oldest orchards planted with both root and top-worked trees, the top-worked ones seem to have given the best results as to fruit and general thriftiness of tree. Especially is this the case with Willow as regards hardiness of tree. Still, I think, this question has not been fairly tested as yet. *In pruning*, my own experience will not justify me in saying much, but this is the result. I would prune the last of February or first of March on young trees not bearing, or just beginning, and in June on older trees if they needed it. But I would so direct and control my trees when young as that as they grow older they would need but little pruning. A word of caution to those of limited experience who contemplate planting trees. Never allow grass, weeds, or other trash, to accumulate around your young trees late in fall and in winter, as the mice, protected by it, may injure many trees before you are aware of their presence in the orchard. Keep a clear space of a foot all around the trunk and they will not touch them. This, at least, has been my experience.

VARIETIES.

Here I only speak of the counties in which I am acquainted, beginning with the early ripening sorts.

Digitized by Google

Red June—Is the popular early apple; although rather below medium in size, it is reliable, both as regards hardiness of tree and bearing.

Red Astrachan—Good tree; first class for cooking; sells well in home markets.

Duchess—Tree one of the best; early and good bearer; fruit very handsome; of fair quality, but does not keep well.

Early Pennock—One of the most profitable early sorts; tree good; early and good bearer; fruit not first class in quality, but very large, handsome, and handles well, which makes it valuable as a shipping variety.

Cole's Quince—Tree good, somewhat straggling when young; very early bearer; fruit large; one of the best.

Sops of Wine—I think will prove a valuable apple for this section; a good bearer; fruit handsome; sells readily and ships well.

Lowell—Tree blights some; good bearer; fruit very large and fine.

Autumn Strawberry—Tree good; fruit first class for eating, cooking or home market, but too tender to ship.

Dyer—Tree good; fruit medium to large; quality the best, but like the foregoing does not bear handling well.

Chenango Strawberry—Not much known in this vicinity; tree good; fruit large; of good quality; in appearance one of the most beautiful apples grown.

Genesee Chief—The only trees known to the writer are those of Jas. Stanton, southeast of this city. These trees were sent to Mr. Stanton fourteen years ago, by mistake, for Red June. I esteem the mistake most fortunate for this part of the State, as it gave us an apple which has no superior as a fruit in its season (September) and very few as a tree. Both tree and fruit much resemble the Dyer. Mr. Stanton says (and he is good authority in the orchard) that it is better either as a tree or fruit, and that is saying a good deal.

Maiden Blush—One of our best fall apples; tree sometimes tender when root-grafted; should be top-worked on some hardy stock. Some of the oldest trees in this part of the district are top-worked. Maiden Blush were planted thirty years ago, on what is now the farm of Col. Nichols, near Panora, Guthrie county; they are thrifty trees and bear well.

Wagener—Not well known, but wherever found giving the best satisfaction.

Digitized by Google

Cracking—Should be better known; fine large fruit, and ripens at a time when fruit is generally scarce.

Grimes' Golden—So far is all that has been claimed for it; our trees are still young; bore well the past year; I find every one that has it wishes they had planted more.

Fulton—This, in its season, is *the apple*; the best to eat out of the hand of any in the list, and to my eye, no fruit is handsomer than a well grown Fulton. Tree a fine upright grower, somewhat inclined to disease in the forks of the tree. I am inclined to think that to top-work Fulton in the branches of Ben Davis, Gros Pomier, or other hardy stock, when three or four years old, it will make a first class tree. I shall try it this next spring and see.

Jonathan—This perhaps is the most popular apple in the district; the hardiness of the tree, its habit of early bearing, combined with first class quality of fruit for either eating, cooking or keeping, all go to make up the above verdict, and I must not omit to say that its color is one of its strong points with buyers.

Ben Davis—is gaining friends steadily, not only as regards the tree (but contrary to my own expectation) as regards the fruit. I looked to see the public pass it by after trial, for some other of better quality. I confess such is not the case. The apple buying public want a fruit that is large, smooth, and showy, and the Ben Davis fills the bill.

I must say a good word for the White Winter Pearmain (as it has had very few of late) it has been one of *my* most profitable apples. The past season has certainly been very dry, yet we had a fine crop of large, smooth, beautiful Pearmains in all this section.

Red Canada—Is growing in favor as the best of the long keepers, but the tree is of very slow growth. I recommend top-working on hardy, thrifty stock of other varieties.

Rawle's Janet, Roman Stem, Willow, Rome Beauty, Winesap, Talman Sweet, etc., are all standard apples, and will continue to be extensively grown.

I have placed upon your tables some very fine Seedling apples, raised in Warren county; they promise to be an acquisition to our list of good, long keepers, but further trial will determine that point.

We have reason to be grateful to a kind Providence for its lavish gifts, in proof of which I have placed upon your tables specimens of some varieties of Dallas county fruit.

I congratulate the society on the result of the Rochester Pomological Convention, secured by the energy of its delegates, Messrs. Lath-

Digitized by Google

rop and Calkins, and conclude by wishing the society a pleasant and profitable meeting.

DISCUSSION.

Geo. H. Wright, Sioux City: We meet together for the purpose of comparing our experiences in orchard management, and varieties. I am quite willing that the orchardists of the central or southern districts should trim up their orchard trees to any height of stem they may choose, but I enter my protest against this plan for the northern portions where I live. Mr. Wragg says he knows of no advantage resulting from the use of low stems. A few days of observation with us would teach a few important lessons. Especially when trees are young, and with little spread of top, do we find them liable to sunscald on the south and southwest sides, unless their tops start very low. In low bushy form we can grow varieties which utterly fail with tall stems. Again, we are told in this paper that pruning may be safely done in February and March. However it may be in Dallas county, this is a bad time for pruning with us. A dark gummy sap exudes with the warm days of spring which results in serious trouble. Such questions are largely hinged on localities in our great State. In selection of site for an orchard I also differ. In our section a northern slope is beyond doubt the best. We have one orchard in our county of one thousand trees that has been three years planted, and not forty trees of the original planting have been lost. Our winds are either north or south, as a rule, and we have most to fear from our south winds. Our air is very dry, and soil very porous, with no rock within a hundred or more feet of the surface. The training of the shape of our orchard trees should commence in the nursery. If a tree has a central shoot, and the limbs diverge regularly from it, the top may as well start within eighteen inches, as four or five feet from the ground. Some varieties are more inclined to make forks in the nursery than others. In cases where forks cannot be avoided, I believe the plan suggested in the paper of interlacing the branches will prove effectual. As to limbs of low trees trailing on the ground, it has no force with us, as our hardy sorts doing well at the north are all upright growers, with deep extension of roots.

H. W. Lathrop, Iowa City: The terms low and high heads are really relative. In the paper the height is fixed at about four feet. Mr. Wright is equally confident that the stem should not exceed two feet. Now, a low tree only three or four years old is very nice; but watch

Digitized by Google

the tree with low head for fifteen years in orchards, and what do we find? The limbs rest on the ground, and we have apples and potatoes together. The lower limbs want the light and the air, if we secure on them fruit worth picking. The apple tree is not a shrub, and any attempt to make a shrub of it, in the end, will not be best for the health of the tree or the quantity or quality of the fruit. A tree headed at proper height will throw out its lateral branches in such a way as not to be favorable to decay in the forks. If the head is very low, the limbs form acute angles with the main stem, and such crotches are apt to become diseased by the lodgment of water.

Mr. Ireland: I am still more favorably inclined to the low-headed trees than Mr. Wright, as Osceola county is even more unfavorably located as to exposure to wind and storm than his locality. At the north we can only grow varieties like Wealthy, Oldenburg, and Whitney No. 20, with upright habit of growth. Such sorts will not have their terminal branches on the ground, if headed only six inches above the soil. I know of no variety succeeding with us that has a drooping habit of growth. The Duchess will make a nice-topped tree anywhere in the State with a very low stem.

Mr. Thatcher: I can say what is best in Van Buren county. We have long since got over our early craze about the desirability of low headed trees.

Mr. Garrison, Des Moines: I have some experience with low and high headed trees, and emphatically it is in favor of the *low heads*. From fifty high headed trees I have received but little fruit. My orchard, with stems not more than eighteen inches high, has been a marvel of relative productiveness. Two years since the frost, on the 12th of May, destroyed all the fruit on the high branches, yet I had a fair crop of fruit, about all of which could be picked from the ground. I can say, too, that no one accused me of selling tasteless or bitter fruit, such as is claimed grows on the low trees. In this windy country the natural tendency of our trees is to the formation of low tops. I shall take nature's plan and grow my fruit on the low tops. So far, I have not been behind in the returns from my trees.

On motion, adjourned to two o'clock P. M., to give time for the arrangements of fruits and flowers.

TUESDAY AFTERNOON SESSION.

Society met pursuant to adjournment. Orcharding at the North was in order.

Digitized by Google

ORCHARDING AT THE NORTH.

BY E. R. HEISZ, NORA SPRINGS.

Mr. President and members—For an orchard site in the northern part of the State I would select dry ground. If high and rolling I would prefer a northern slope. In after culture, if the soil is dry with porous subsoil, I would advise but little ridging up; but if the soil is inclined to be wet at times, with retentive subsoil, I would ridge by repeated plowings toward the trees.

Where possible, run the rows toward the sun at one o'clock, at a distance apart of twenty-eight feet. In light porous dry soils, and on side-hills, I would set trees quite deeply. On heavy soils, or on soils with retentive subsoil, I would set trees little, if any, deeper than they stood in the nursery. The holes should not be dug but little, if any, deeper than the trees are to be set. Where possible, select none but good trees three to four years old, without forks, and with a central ascending shoot from which the branches diverge. As far as possible avoid having two or more of the branches starting from opposite points on the central stem. It is best to set the trees leaning to the one o'clock sun. The strongest branches should also be placed in the same direction to shield the trunk from the sun. As to length of trunks, it is not best to go to either extreme. With most varieties that are hardy enough for the north when root-grafted, a stem of about three feet is probably best. In top-working on strictly iron-clad stocks, a stem of four or five feet may be admissible.

I have found it best to grow corn among the rows for five or six years, and then to seed down with clover as the trees come into bearing. If the trees, after this, fail to make a growth of ten to fifteen inches a year, apply a light coat of manure in the fall. It is not so good to apply it in the spring, but it will be better to apply it then than to neglect it, if they are not making reasonable growth. After the trees have borne a liberal crop of fruit do not be afraid to apply a liberal coat of manure. I have not tried buckwheat in my orchard, neither has Mr. Humphrey.

All things considered, the last of March and the first part of April

Digitized by Google

are the best times to prune for more wood and vigor of growth. June is the best time to prune for more fruit. Any tree suspicioned of being tender, should be pruned in June, if at all. Only the strict iron-clads should be pruned early; and if the season is cold, the early pruning should come later than the time named. Avoid removing large limbs at any time. A little timely care in removing a twig, or pinching a terminal bud, will start the trees in the way they should go.

As to varieties, I can only give a few notes of experience. First and foremost, be sure that your varieties are of the kinds doing best in your section, and try to be sure that the trees you set for Duchess, Gros Pomier, Plumb's Cider, etc., are true to name. If you have your neighbor's list of best trees, the sharpers who will importune you have only to affix these names to the most worthless trash. Buy every time of reliable men, if you go a long distance for your trees and they cost you a little more money. As a rule, though, the reliable nurseryman will sell you the right kind of trees for far less money than the itinerant swindlers will sell you their trash. I would, with my present experience, set three-fifths of the orchard, or more, with Duchess, Plumb's Cider and Gros Pomier, upon which to top-graft, the spring after setting, the varieties we need that will not do well at the north root-grafted. With us the Gros Pomier is not quite so reliable as a stock as the two first named. At least three-fifths of the trees should be winter varieties, and about all of them should be top-worked on the stocks named. Grown in this way, I can recommend Jonathan, Domine, Grimes' Golden, Seek-no-further, Willow, a few Talman Sweet, Ben Davis, Walbridge and English Golden Russet. Perhaps the two last may do root-grafted.

Three-fifths of the winter sorts should consist of Willow and Ben Davis. It is all wrong to cry down the quality of the Ben Davis for a market variety, but it must be top-worked with us, on a hardy stock, "and don't you forget it."

The two-fifths of summer and fall varieties will do on their own stems. Astrachan, Duchess, Gros Pomier, Plumb's Cider, Wealthy and Fameuse would make up a good list. Most likely it will pay best to top-work the Astrachan; but it is most apt to be hurt in the forks and main limbs. Density of top usually obviates this difficulty. So far, with its defects, it has been worth all the early apples put together. I should not plant heavily of the Gros Pomier, Plumb's Cider, or Duchess, unless near a large town. It may be that we should

Digitized by Google

class the Fameuse among the early winter varieties; further trial may prove the same of the Wealthy. This season, a half bushel kept for test of keeping qualities, were one-fourth rotted October 15. But the season has been unfavorable for the keeping of any variety; but I am now quite sure the Fameuse is the best keeper. As is usually the case, I have found that the specimens of the Wealthy from young trees keep better than those from trees which have borne several crops.

Further experience with the Walbridge may justify its more extended planting, as it is quite promising as a winter variety, with fair capacity for keeping. So far, I have talked of market orcharding. For family orchard, we can grow with satisfaction by top-working the Dyer, Porter, Early Pennock, Saxton, Cole's Quince, Fall Orange, Utter's Red and Pewaukee. With less profit we can grow Early Joe, Benoni, William's Favorite, Jewett's Red, Fall Wine, Roman Stem, and others. I have said nothing of the new varieties. This is partly for the reason that they are not yet common in the nurseries, and partly because they are yet under experiment. Our first impressions as to hardiness of tree and value of fruit of these new varieties are faulty. As with the Wealthy, the first fruits of a seedling are fairer, and keep better, than when the tree attains some age. Again, some varieties give evidence of great hardiness when young, and utterly fail after bearing their first full crop of fruit. The Wanpacca County Seedlings will not all prove acquisitions. *Stone's Seedling* is beyond doubt the Saxton under a new name. Rich's Greening will not keep as long as we expected; at least the past two hot seasons it has not kept better than Seek-no-further or Jonathan. The Weyenwega, Wrightman, Evaline, Martha and Wolf River are the only ones we have the most faith in as additions to our northern list. Indeed, we have, as yet, not much proof of value in these. The Wolf River has proven itself an iron-clad. The fruit is large, handsome, and is good enough in quality, but it is only a late fall variety. The Martha is large, beautiful, and keeps with us into midwinter. Evaline keeps some longer. Weyenwega is large in fruit, and bids fair to keep longer; but we are not yet sure of the tree as a root-graft. Of the Canada varieties, the Canada Baldwin and McIntosh Red are promising. So, we are now sure that some of the Russian varieties of the Department importation of 1870 will prove valuable. Two or three summer, and as many more winter varieties are already becoming candidates for favor at the north.

But we must not be enthusiastic over novelties, only so far as to

Digitized by Google

keep up a healthy system of experimentation. The Agricultural College is now on the right track. Not only should an experimental orchard be kept up on the farm, but such an orchard should be started in various parts of the State. Where the varieties in such experimental orchards have been found valuable, in climates as severe as ours, we can hope for rapid additions to our iron-clad list such as in this paper I have recommended for stocks.

With a few rambling suggestions I will close, hoping that you will enlist younger men in the work of writing your reports.

Some orchards here blighted badly last season. The conditions favorable to blight seemed to be rapid plethoric growth, southern exposure, exclusion from currents of air, and lack of shading of soil. Yet in one case of severe blighting the ground was shaded with clover, the situation was favorable to wind sweep, but the orchard had been very severely pruned.

As to top-working, it seems to me that the work should be done in the nurseries and our people educated to pay a trifle more for the trees. As a rule, if our farmers set out stocks with a view to top-working, it rarely gets done; or if done, it is rarely a success in getting uniform tops if the scions start at all.

I have found spring budding with scions kept over winter, as for grafting, an excellent mode of changing the top. The planting of crab trees is losing ground.

We have had a fine crop of apples at the north the past two seasons, which is encouraging our people to plant orchards.

DISCUSSION ON REPORT.

Mr. Patten: On this matter of top-working on hardy stocks I have some experience, but it is not favorable to the Dominie as being hardy enough for our climate, worked in this way, or any other. The English Russet is far hardier and should not be classed with Dominie as to hardiness.

As to height of stem of orchard trees I cannot endorse the idea of some of our northern friends. In our county we have some trees now twenty-five to twenty-seven years old. The trees with stems from three to four feet in height, are in far the best shape at this age. The very low bushy trees have a tendency to make main stems of the lower side branches, and the acute angles in the forks soon become cankered and diseased, even with hardiest varieties. With higher heads the

Digitized by Google

limbs diverge from the main stem in more spreading form, and the forks are less liable to become injured. Mr. Heisz is correct in recommending the leaning of the trees in planting to the one o'clock sun. If the top on the north and northeast side becomes at any time too heavy it will pay to shorten it in.

Mr. Wragg: Three weeks ago I visited the best orchard, perhaps, in Dallas county. In it were planted ten years ago a great number of Ben Davis. In passing I called the attention of the owner to the Ben Davis trees with very low tops, and contrasted them with those having stems four to five feet long. Without seeming exception the very low tops had several upright branches, with acute angled forks, almost invariably seamed by the action of frost. The trees that *break down* are of this class.

Mr. Dixon: We seem to see things from a different standpoint. If a tree is started right in the nursery, with a main central stem from which the branches diverge, I do not care how low the top is formed. In 1868 the supply of trees in our nurseries was short, and I got a mixed lot of high and very low trees. Especially with the half-hardy varieties, the low tops have done the best. I can even grow the Belmont if I start it at the ground, so that the stem will not fail. The splitting depends on leaving forks where the top commences. Low or high, these forked tops are apt to split down.

Mr. Lathrop: How high do you now form the tops?

Mr. Dixon: Hardy trees like Ben Davis may have a stem of two to two and a-half feet. Less hardy sorts I prefer as low as I can get them, if I grow them at all, Even the Ben Davis will scald in the trunk if the top is too high. Rawle's Janet and Jonathan we find very unsatisfactory with tall stems. We have trouble with the flat-headed borer with varieties liable to sun-scald. Grown in regular bush form we can grow American Golden Russet.

C. L. Watrous: Our nurseymen are too careless in sending out trees with low forks. The specimen which I hold in my hand will illustrate the point. If, as in this case, the stem divides into from two to four main branches while the tree is young, all of them become main ascending branches, attaining about equal height. Few varieties will retain health in these main forks trained in this way.

Mr. Calkins: We cannot too strongly impress this idea of starting a tree right in nursery. In the hands of the expert it is true that such defects can be largely remedied after the tree is put in orchard. But the rule is that the tree grows in orchard as it is started in nursery.

Digitized by Google

Mr. Patten: I must reiterate my protest against the very low tops. I am opposed any way to attempting to grow north varieties defective in stem, except by top-working on iron-clad stocks. If I did try to grow root-graft trees defective in stem, I would shade stems by boards, or in some other way than by low bushy tops. If the branches diverge from the main stem at four feet from the ground the forks are not acute angles and are less liable to injury.

John Smith, Des Moines: My experience and observation in this vicinity are by no means favorable to low tops. It seems all right when the trees are bearing their first crops, but as they attain size and age the fruit on the lower limbs becomes worthless and these limbs have to be removed, to the great injury of the trees. Yet the Jonathan, Dominie, and some other desirable sorts, are liable to sun-scald. It is much better, though, to top-work on hardy stocks at a height of five feet than to bother with trees kept in bush form. In these very low trees I have found that the borer does its most destructive work.

Mr. Bruner, Toledo: I also favor the high tops. The benefits supposed to accrue from the very low tops are mainly imaginary. Increased experience always does away with such notions. The slight benefit of the low tops in the way of shading the trunk is nothing compared to the troubles brought about by the forks near the ground. In such forks dead wood and flat-headed borers are quite sure to be found, and sooner or later the branches will split down, about ruining the tree.

Prof. Lummis: If you try to make a shrub out of a tree, nature rebels. The roots of our prairie trees run deep. In like manner the tops should be encouraged to make upright and free growth.

Mr. Ireland, Osceola county: I grew up in New England, and it was hard work for me to accept some lessons taught me by our prairie winds and climatic variations. It is useless to talk about trees growing up in the majestic way our eastern friend hints at. The oak will tower in the shelter of the heavier timber of ravines and bottoms, but on the exposed bluffs of the forest margins it grows low and bushy. On the still dryer and more exposed plains to the west of us it becomes a mere dwarfed shrub. I have nothing to say about growing trees tall in relatively sheltered positions, such as are found in many places in the State. In Osceola county we must get our trees low. We will lose nothing by the low tops if we avoid forks by maintaining a central stem from which the limbs regularly diverge.

Mr. Garrison, Des Moines: I commenced putting out trees in 1855.

Digitized by Google

It may be said that I have been here long enough to have an opinion on this subject, more especially as I have grown orchards with high and low stems. My best orchard in health, symmetry of trees, and production of perfect salable fruit, is on the plan of very low heads. I got one thousand one-year trees that had never been cut back. I started the tops very low, but was very careful to maintain a central stem. This orchard has been very profitable.

Mr. Hilton, Keokuk: I have some experience, and though I live in the extreme south part of the State, I am happy to confirm the idea advanced by some of our northern friends that a manifest benefit is derived from the low tops. I have low trees now twenty-five years in orchard, and perfect. I need hardly repeat that these low trees must be started right. If low forks are permitted they will split down.

R. P. Speer, Cedar Falls: I do not think our time is wasted in prolonging discussions of this kind. We need experience meetings. We are all yet relatively young in prairie experience. Those who read the eastern papers and reports know that this idea of low tops is gaining ground east and west. One of the older settlers of our southern district fully endorses Mr. Wright and Mr. Ireland, who are in the extreme north. There are some advantages in tops of respectable height, but it is best to split the difference. I am more and more inclined, as the years go on, to restrict the list for orchard and nursery to the true iron-clads. Such kinds can be grown with stems three or four feet in height, and they can be grown with stems six inches long, if no forks are allowed. I believe in the planting of young trees that can be easily started in the way they should go. Five-year-old nursery trees I always sell at half price. I will add that we can grow trees with higher stems on low than on high ground.

The Lombard plum fails in the stem badly with us. I have found that it does far better when grown as a perfect bush with no stem at all, but with branches starting at, or below the ground.

Mr. Wright: The Lombard fails in our part of the State by winter killing of top. The talk we have had about leaning of trees reminds me of the variations of surface winds in our State. With us we have mainly north and south winds. Our trees in exposed positions have little tendency to go up. The Box Elder, when isolated, flats out into a low spreading tree. We do not favor too close shelter on the north and west of our orchards. Our summer heat, and hot, dry southwest winds—coming to us, though, apparently from the south—makes it most desirable to have the shelter on the south. Our trees surounded

Digitized by Google

by timber belts are injured far more by summer heat than the exposed ones are by winter cold.

John Smith: If our trees are set perpendicular they are quite sure to lean in ten years to the northeast. In setting I lean to southwest, and take pains to place the heaviest portion of the top in that direction.

Mr. Carter: The use of the knife in our orchards needs much discretion. The first years of orchard growth are the most important. A little timely pinching and clipping will at this time form the model tree. I prefer two-year-old trees for orchard planting. A tree of this size, with a little timely care, may be set upright. If you lean to the southwest the heaviest part of the top is sure to form on the opposite side. I do not like a top lower than three feet. In no case must the lower limbs become so dominant as to be rivals of the main central shoot.

Report of standing committee on Forestry Annual was now in order.

The chairman of the committee announced that the pamphlet itself was all the report needed, except the reference to it in the report of the Secretary.

Report on Forestry was now read by Suel Foster, from the committee above noted.

FORESTRY.

BY HON. SUEL FOSTER, MUSCATINE.

Mr. President and fellow members—I see that I am on the Forestry Committee. I trust this will give me the privilege of saying something on this subject, which is one I so much like to call the people's attention to. I have heard many farmers say that they wished they had set more trees years ago, as by this time they would have been large enough to be of some service in breaking the wind, besides the timber would be useful for fencing and fuel. *It is never too late to improve the condition of the farm.*

It is advisable for this society to reduce the number of varieties of

Digitized by Google

deciduous trees for wind-breaks and farm use. Catalpa, Larch, White Ash, Black Walnut, and Osage Orange, where it does not kill, in limited quantities, will make a valuable list.

For ornamental trees, Catalpa, Sugar Maple, Elm, Norway Spruce, and White Pine.

I believe some trees are more profitable than others, and we cannot too forcibly impress upon tree planters the importance of *selecting the best.*

I am of the opinion, from the evidence we have, that the hardy Catalpa is worth four times as much for the farmer to plant as any other tree in our list, and I cannot let any opportunity pass without earnestly recommending to our farmers the superior value of this tree, its ease of transplanting, its rapid growth, its great durability, its value for building purposes, its great value for railroad ties, etc. If it is a good and valuable thing I do not want the other Western States to get much ahead of this society in giving it to the people by its endorsement. I wish to read a short letter from Robert Douglas relative to this tree:

WAUKEGAN, ILL., January 8, 1880.

Dear Mr. Foster—Your favor of yesterday to hand enquiring about our planting Catalpa Speciosa, in Kansas, last November. We planted 220,000 for the K. C., Ft. Scott & Gulf R. R., on their land, seventeen miles south of Ft. Scott, in Crawford county, where they have fenced in a section (640 acres), for the purpose of experimenting with the different kinds of forest trees. Catalpa Speciosa proves to be a distinct species, and Dr. Engleman will report it as *Catalpa Speciosa of Warder.* Dr. Warder's name, *Speciosa* antedates your name, *Hardy.* The whole country is greatly indebted to Mr. Barney, Dr. Warder, and yourself for the pains you have taken to introduce this tree, for it is certainly *the tree* south of forty-three degrees, and I think we can squeeze it up to forty-four or forty-five degrees

We are having it tested everywhere. The Conservator of forests (in Her Majesty's service), at Lahore in the Punjaub, East Indies, reports to us that "seeds sown, March last, had, in six months from time of sowing, made a sturdy growth of ten feet." "*How is that for high?*" We have sold him several pounds of seeds which he says he will sow on bottom lands and get a larger growth. The others were sown on upland.

Through the kindness of Mr. Barney we also received orders for several pounds of seeds from the Board of Agriculture of Australia, also the Ex-Premier of Australia; also from Natal, South Africa. And we have sent the trees out in one dollar packages by mail, 100 trees in each package, into

Digitized by Google

all the States and Territories south of forty-three degrees, and north of that, *gratis*, for testing; also to the British Provinces and England, so I think that there never was a tree so widely distributed the first season after its being fairly brought to notice, and I might say that it seldom happens—where one firm owns nearly all the stock—that a new tree will be sold at the price of common trees, as in this case.

This tree is certainly attracting considerable attention in foreign countries. Dr. Bolle of Berlin, delivered a lecture, nine mortal pages of which is reported in the *Monatsschrift* for September, and the London *Gardener's Chronicle* has had several articles on this tree the past three months; over two columns in the December 20th number. In fact, so very much attention has been bestowed on this tree by so many of the Botanists in this and other countries within the past twelvemonth, that I begin to think that before another year comes round, our Eastern editors will be willing to admit that we have got a Western Catalpa tree.

Very truly yours,

ROBERT DOUGLAS.

DISCUSSION ON REPORT.

Mr. Calkins: We were unfortunate in our section in planting at an early day the tender variety. The trees attained considerable size; were very beautiful, and its shade is very perfect and refreshing. I am very glad that a hardy variety has been brought into such prominent notice.

Mr. Van Houten: This beautiful and useful tree is very easy to propagate, either by seeds or cuttings. Further north, in the valley of the Missouri, we are not yet sure the Catalpa will be hardy.

Mr. Patten: At the north we must go slow with the new found favorite. Because it does well at Muscatine or Waukegan, Ill., is no reason why it should prove generally hardy on the great prairies. Our papers generally commend, as one of the best hardy shrubs, the Weigelia Rosea; yet, at my place, it is far too tender. We have had the mercury down this winter to thirty degrees below zero. But we will favor the Catalpa so soon as we are sure it will endure with us.

Report of committee on adaptation of varieties to soils, was now in order. By permission, the following valuable paper was read:

Digitized by Google

CAUSES OF BLIGHT, MILDEW, RUST, ETC.

BY HON. R. P. SPEER, CEDAR FALLS.

Our losses by blight, mildew, and rust on fruit trees, vines, the cereals, etc., have become so great and numerous, that I determined, during the past summer, to ascertain, if possible, their causes, and will state the result of my investigation as briefly as possible. Many fruit-growers believe that fruit tree blight is caused by severe cold weather, or sudden and frequent changes in the temperature of the atmosphere in winter. If atmospheric conditions in winter cause it, then the Transcendent crab, the English Golden Russet, etc., which ripen their wood early and are known to be hardy, would be less subject to it than certain tender varieties which do not ripen their wood at the proper season, and which are scarcely ever, or never, attacked by it. If it resulted from low temperature, then its attacks would be confined to orchards in northern latitudes; but it has proved very destructive to fruit trees in localities where the mercury has never touched zero. When trees have been much injured by cold or other causes, a sickly growth has been the result; while blight has always been preceded by an unusual growth.

I have never known fruit trees to blight seriously except after remarkably warm, damp weather, and it is only after such spells of weather that attacks have been made on wheat and oats by rust, on grape vines by mildew, and on potatoes by rot. Rust and potato rot are forms of blight, but they could not have been caused by cold, because the rusted stalks of wheat and oats, and the potato vines affected by rot, were not in existence during the previous winter. If mildew is the result of cold, is it not strange that vines which were thoroughly covered with earth during winter have frequently suffered as much by it as others of the same variety which remained on the trellis? We could give other reasons which would make the fact more clear that blight, mildew, etc., do not result from any derangement of the cell structures of trees and plants by cold in winter, but consider it unnecessary. Botanists and microscopists have decided that fungi cause the diseased appearance of trees and plants attacked by blight or mil-

Digitized by Google

dew; but they disagree as to whether fungi are the primary or only a secondary cause of the disease, and also upon the question: how is the attack made? Fungi are plants of a low order, such as mould, mildew, etc. Most people know but little about them, because many of them are too small to be seen or examined by the naked eye. The germs or seeds from which they grow are called spores. A high temperature and considerable moisture favor their germination and growth. "All fungi require for their nourishment the previous formation of an organic substance; they do not possess the capacity of assimilating food materials, *i. e.*, of transforming them into substances which will directly support life. Many of them are, therefore, saprophytes growing only on dead organic substances; others are parasites, growing on living animals or plants." The important questions to which no satisfactory answers have yet been given, are: On what particular part of a tree or plant attacked by fungi did the spores which produced them germinate? and, how did they begin to grow?

Because the spores of fungi exist in stagnant water and in undrained soils, some botanists believe that they are absorbed by the roots of plants and trees, and germinate under their bark; but there is no foundation for such belief, because the roots of plants absorb from the soil only substances which are in a state of solution, and no organism could become soluble and retain life. The elective power which plants possess of absorbing only such substances from the soil as are adapted to their wants, is unfavorable to the theory just advanced. By careful experiments the fact has been determined that the spores of yeast cannot pass through a fine filter of earthenware, or through cotton wool; is it probable, then, that spores of parasitic fungi can be absorbed by plants through the delicately formed pores of their roots?

Some writers tell us that "the young parasitic fungi, after germinating, attach themselves to the orifices of the stomata (pores) of trees and plants, and quickly multiply there, causing injurious and frequently fatal diseases." The statement just quoted is not false, but very unsatisfactory, as we are not told whether the spores germinated in water which was on the bark or leaves of the plants attacked, or in sap which had been forced by some means through their stomata. As this is the important point to be decided, I will offer the following proposition, and my reasons for believing it true: Blight, rust, mildew, etc., are caused by parasitic fungi which germinate in sap that has been forced through either the stomata of plants and trees, or wounds made in their bark or leaves by insects, etc., by the pressure of sap circulation.

Digitized by Google

As we said before, fungi cannot assimilate food materials, but depend for their nourishment upon that which has already been assimilated, and specially adapted to their wants. For this reason the potato fungus cannot subsist upon the juices of the grape vine, nor can the grape vine fungus live upon the juices of an apple tree. If from a single vine a thousand others should be produced from cuttings, all of them would be constructed alike and contain the same kind of sap.

Then if spores can germinate in a drop of dew or rain on a leaf, and have the power to extend their mycelium (roots) through the stomata of the leaf to the sap within, why do we find occasionally in a row of grape vines, of the same variety and surrounded by the same atmospheric conditions, only one or two vines badly mildewed, and all of the others in a healthy condition? Also, if the young fungi, after germinating, can obtain sufficient nourishment from a drop of water to enable them to force their mycelium through the epidermis of bark or leaves to the juices within, then why do they invariably attack plants growing on ground to which large quantities of nitrogenous manures have been applied, in preference to others of the same variety growing on new ground or clover sod? If the power which plants possess and use in forcing sap from their roots to their leaves was more thoroughly understood, it would be less difficult to answer such questions.

In two carefully conducted experiments, made for the purpose of ascertaining the force of the sap in growing plants, the result was as follows, to-wit: In the first experiment, by Dr. Hales, the force of the sap was found to be equal to thirty-eight inches of mercury, or seven times greater than the force of the blood in the artery of a dog. In the second experiment, by Burcke, it was found that the force of the spring sap in a vine was equal to the weight of fourteen and one-half inches of mercury, and therefore exerted a force equal to that of a column of water one hundred and ninety-five feet high. While making these and other similar experiments, it was found that the pressure of the sap was much affected by the atmospheric pressure. All close observing fruit growers know that severe attacks of blight, mildew, etc., have always followed spells of extremely hot, damp weather, which were accompanied by low atmospheric pressure. At such times plants make an extraordinary growth, and it is not unusual to hear farmers' boys say that they "can almost see the corn grow," and their fathers declare that "if such weather continues much longer the wheat will certainly rust." When low atmospheric pressure and very high sap

Digitized by Google

pressure in plants and trees occur together for several days, more crude sap will be forced into the leaves than they can assimilate. During such times an enormous pressure within plants meets with but feeble resistance from pressure without, and it would be strange if no part of their juices should be forced through the pores of the bark or leaves of the extremely tender shoots. We have less reason to doubt that sap is forced through the stomata of tender plants, than we have to doubt that blood was ever forced through the pores of the skin of persons who had climbed to the summits of high mountains, where the atmospheric pressure was low; because we know that the pressure of sap circulation in plants is many times greater than that of blood circulation in animals. During spells of weather which favor blight, there is sufficient moisture in the atmosphere to prevent the particles of sap which have been forced through the stomata (pores) of tender leaves or bark from drying, until after the spores of fungi have had time to germinate in it and extend their mycelium to the sap or juices within.

That juices are forced through the stomata of plants, is proved by the presence of what is called honey-dew on leaves, which show under the microscope no signs of having been attacked by aphides or other insects. To enable fungi to attack a plant or tree, it is not necessary that sap should exude through the epidermis of its bark or leaves in quantities sufficient to be visible to the naked eye, because the spores of many forms of fungi under a powerful microscope appear to be only insignificant points. All varieties of the apple contain sap in which the apple tree fungus will thrive, and all grape vines contain sap which is adapted to the wants of the grape vine fungus; but all apple trees do not blight, and all grape vines are not subject to mildew. The principal reason why all varieties of a species of trees or plants are not affected alike by blight, is because some varieties are so constituted as to require the absorption of a smaller quantity of liquid food materials from the soil than others, and consequently the pressure of sap circulation in each variety will be in proportion to the quantity of liquid matter absorbed.

To prevent any doubts in regard to this difference in the absorbing power of trees of different varieties, I will illustrate the matter more fully. If we should plant Duchess of Oldenburg and Tetofsky trees, which had been grafted upon seedling roots, the trees will make a slow growth, and after becoming thoroughly established, they will make many sprouts from the seedling roots upon which they were grafted.

Digitized by Google

If such sprouts shouldbe removed others will take their places. But if we should put Gros Pomier tops on them, the sprouting at the collars will cease and the trees will make a rapid growth, because the tops will require and take all the food materials which the roots can furnish. Certain varieties of trees and plants are more subject to attacks of blight, mildew, etc., than others, because they are more sensitive to the effects of heat. For instance, the buds of the Transcendent and other varieties of the crab are opened into leaf every spring by an amount of heat which does not perceptibly affect Rawle's Janet.

Therefore, during spells of weather which are unusually favorable to growth, the pressure of sap circulation will be much greater in varieties which are very sensitive to the effects of heat than in others which are not. Also, the difference between the size of the stomata (pores) of different varieties of trees, and the construction of the epidermis of their bark and leaves will affect their liability to blight. A surplus or deficiency of water or food materials in the soil will also affect the circulation, and tend to promote blight or prevent it. The root-pruning plan adopted by Dr. Hull, of Alton, to prevent blight, was in the right direction, because by shortening the roots of the trees he lowered the pressure of sap circulation.

A few years ago William Saunders placed boards over a row of grape vines in a vineyard, near Baltimore, in such a manner as to prevent their leaves and tender branches from being wet by dews or rain. The object which he had in view in making the experiment was to determine whether the frequent wetting of the leaves by dews and rain was favorable to attacks of mildew or not. During the summer the covered vines remained in a healthy condition, and in an adjoining row of the same variety which was unprotected, all the vines were badly mildewed. In A. D. 1868 Judge King, of Dubuque, reported to the Iowa State Horticultural Society similar experiments with like results. In such instances the protected vines were not injured by mildew, because the particles which were forced through the stomata (pores) of their leaves became dry before the spores of the grape fungi had time to germinate in them and make a successful attack. All the stomata of grape leaves are on their under side.

Then, if the spores of fungi can germinate only in, and derive sufficient nourishment from, sap which has been forced through the stomata of grape leaves to cause mildew, such attacks will be made only on their under side. But if they can germinate in and obtain sufficient

Digitized by Google

nourishment from a drop of water to cause mildew, such attacks may be made on either or both sides of the leaves.

But attacks of mildew are invariably made on the under side of the leaves. Therefore the spores of fungi cannot germinate in or obtain sufficient nourishment from water to cause mildew. The leaves of the Cottonwood and other kinds of forest trees are frequently attacked by mildew, but in most of such instances it will be found that the epidermis of their leaves have been injured by mites or aphides. And when such injuries have been inflicted, only ordinary pressure by sap circulation is necessary to supply fungi with an abundance of food. It is probable that the spores of some forms of fungi may exist only in certain localities; as the European grape vine fungus was unknown until A. D. 1845, when it was observed in a hot-house in England. In six years it spread through France, Spain, and Italy. Then, if the spores of fungi are more numerous in some places than others, it is not difficult to understand why trees standing in the vicinity of another which was suffering from blight have been more frequently attacked by it than others which were more remote, because the spores detached from the fungi on the first tree attacked were more numerous near to than at a considerable distance from it. If unusual sap pressure, caused by the excited growth of trees during spells of damp, hot weather, causes blight, mildew, etc., especially when there is a low atmospheric pressure, how can such diseases be prevented? We cannot control the temperature, moisture, or pressure of the atmosphere, therefore we cannot prevent them, except by discarding the varieties of plants and trees which have proved most liable to their attacks, or by adopting methods of culture which will enable us to control the temperature of the soil, and the quantity and qualities of the plant food which it contains. By draining, deep plowing, and growing clover a soil can be made more porous, more accessible to atmospheric moisture, will retain a more even temperature and produce a more constant growth in plants than one which has been plowed to the depth of only a few inches. By sowing buckwheat early in the spring in an orchard the temperature of the soil will be much lower and more even during the hottest part of the summer than where corn or potatoes have been planted. Whitewashing trees with lime is unfavorable to blight, because the white color of the lime will reflect the heat of the sun more than the dark color of their bark.

Digitized by Google

The popular practice of severely cutting back the branches of grape vines annually has a tendency to cause mildew; because (at the time when the disease usually makes its appearance) the roots are making an extraordinary effort to replace the parts cut off with branches which are unusually tender and succulent, and the pressure of sap circulation is confined to narrower limits than though less pruning had been done.

When the average yield of wheat in Iowa, for a term of years, has not exceeded nine bushels per acre, being less than one-third of the average yield of California and certain other localities, it would be useless to argue that the soils and climate of Iowa are adapted to wheat culture. Our soils contain too much decomposed vegetable matter, and too little of the inorganic mineral substances which wheat requires. We get a great growth of soft, porous straw, and a part of the growth is frequently made during spells of extremely hot, damp weather, which causes the blades and stalks of wheat to become so gorged with sap that rust necessarily follows. If farmers have determined to continue raising wheat, they would undoubtedly be more successful if they would prepare the ground on which they intend to sow it in a different manner from that which is now practiced. When preparing ground for wheat, if farmers would use at least three strong horses and let their plows down to twice the present average depth, they would be troubled much less with rust. During spells of hot, damp weather the roots of wheat; in ground which has been plowed ten inches deep, will absorb a less, but more constant, quantity of liquid food materials, and of much lower temperature, than in a soil which has been plowed only five inches deep. Consequently, in the first instance, the danger of furnishing food for fungi by the pressure of sap circulation will be less than in the latter.

DISCUSSION ON REPORT.

The time not permitting discussion the remarks made are added to those made on the same topic in after discussions.

Reports on Entomology were now in order and read in whole or in part.

Digitized by Google

REPORT ON BARK-LICE.

BY J. DUNCAN PUTNAM, DAVENPORT.

The little time I have been able to devote to entomological work during the past year has been mainly occupied in the study of bark-lice, and more particularly of the anatomy and development of *Pulvinaria innumerabilis Rathven*, the large bark-louse on the soft maple, of which an account was published in the Transactions of this Society for 1877, under the name of *Lecanium acericola* Walsh & Riley, by which it was then known. A very full report of my observations upon this species has just been printed in the proceedings of the Davenport Academy of Natural Science, Vol. I, where those who may be interested will find full details. My investigations, having been prompted mainly through a desire for the increase of knowledge, have naturally been from a scientific rather than an economical point of view. But with insects so anomalous in their form and habits, and so thoroughly protected by their form, size, color, and coverings, as are the bark-lice, these minute anatomical and physiological details become of great value in aiding us to intelligently devise means for their destruction. As these details, in themselves, would probably be of little interest to you, and have besides already been published, I will confine the present paper to a few more practical suggestions, beginning with an account of the various species known to me to infest trees in the vicinity of Davenport.

On the apple we have three very distinct species; two of which, the oyster-shell scale (*Mytilaspis pomicorticis* Riley), and the Harris scale (*Chionaspis Harrisii* Walsh), are too well known to you to need more than a mention in this place. Both of these species have at times been exceedingly abundant in Davenport, but during the present winter there are fewer of their scales on the trees than usual. The third bark-louse on the apple does not appear to have been hitherto noticed by either entomologists or horticulturists. It is much smaller than the others, covered by a scale nearly circular in form and closely resembling the bark in color. I have found it only in small numbers on the trunks

Digitized by Google

and larger limbs of old trees, generally under the loose bark. This is an undescribed species of *Aspidiotus* related to the *Aspediotus nerii*, so common on the oleander, etc., in badly kept hot-houses. Should it become abundant, as might easily happen under favorable circumstances, it would be a most difficult insect to deal with.

Bark-lice closely resembling, and very probably identical with the Harris scale, are also found on the pear, crab-apple, mountain ash, etc. Others, not perceptibly different from the oyster-shell scale, are found on the Chinese wisteria and Persian lilac, but never on the pear.

On the grape we have two species; one, *Pulvinaria innumerabilis*, introduced from the soft maple, bears a singularly close resemblance to the *P. vitis* of Europe; and the other, a large hemispherical dark brown bark-louse, laying a vast number of white eggs in the cavity beneath the scale. This last species belongs to the genus *Lecanium*, and appears to be as yet undescribed, though it has been often mentioned in agricultural papers, incorrectly, as *Lecanium vitis*, which is a *Pulvinaria* and lays its eggs in a "cottony" nest, composed of waxen fibers and projected from under the posterior end of the scale.

On the red currant I have observed two species; one, a large, yellowish brown, elevated scale; is probably the *Lecanium ribis* of Fitch. The other forms a white blister-like scale, very similar to the Harris scale in appearance, and is probably undescribed. Both occur in very small numbers.

On the mulberry I have noticed a large hemispherical brown scale, probably *Lecanium mori* Signoret.

On both the shell-bark and bitter-nut hickories I have found a very large, oval, elevated, dark brown scale, possibly the *Lecanium caryal* of Fitch. It is not very plenty.

The soft maple *(Acer dasycarpum)* is very badly infested by the two species described in the transactions of this Society for 1877; *Pulvinaria innumerabilis* Rathvon, forming large white egg-nests composed of waxen filaments, and *Aspiodotus (Diaspis) ancylus* Putnam, forming a circular sub-conical scale similar to the new circular scale of the apple, but a little larger and darker. Both of these species infest, also, the linden *(Tilia Europea)*, and *P. innumerabilis*, in addition, is found on box elder *(Negundo aceroides)*, sugar maple *(Acer saccharinum)*, sumac *(Rhus glabra)*, grape vine, locust, etc. This last species has received a very decided check in its increase through the attacks of its numerous parasites and enemies, so that for several years to come it probably will not attract very general attention, in Davenport.

Digitized by Google

On the sugar maple *(Acer saccharinum)*, in addition to the *Pulvinaria*, is found a small circular scale, similar in appearance to the *Aspidiotus ancylus* on the soft maple, but dwelling on the leaves in summer and on the branches and trunk in winter, and differing in other particulars. This is, as yet, undescribed, and I have found it only in small numbers.

In addition to the above, a very large number of species of bark-lice are found in hot-houses; such as the circular scale of the oleander *(Aspidiotus nerii)*, the brown scale of the oleander and ivy *(Lecanium hesperidum)*, the mealy bug *(Dactylopius adonidum)*, and many others.

These species are such as I have happened to discover without any systematic search; there certainly must be many others which have been overlooked. Except *Pulvinaria innumerabilis*, *Mytilaspis pomicorticis*, *Aspidiotus ancylus*, and the new *Aspidiotus* on sugar maple, all these species are known only in the adult female state; their life histories have still to be worked out. Although differing in details there are many phenomena common to all the species, so that when the life of one is known those of the others can more easily be traced.

The effects produced by the bark-lice upon the trees varies somewhat with the different species, and also with the vitality of the tree. As a general rule, it may be stated that it takes a very prolonged and severe attack to produce any very disastrous effect upon the tree. In the case of the *Pulvinaria* on soft maple, the green of the leaves begins to fade away until they turn yellow and prematurely fall off, then the smaller outer extremities of the twigs die, and if the devastation is very excessive or prolonged the larger branches follow until finally the entire tree dies; badly affected trees become more stunted in their growth, the bark becomes roughened and darkened, their leaves smaller and weaker, and put forth later and shed earlier than on healthy trees. The effects upon other trees is probably somewhat similar. An unhealthy tree appears, also, to be more liable to the attacks of insects than a sound one.

We come now to the important subject of how to counteract the evils inflicted by bark-lice. I believe that with care and patience it is possible to annul their bad effects in all but old and very badly infested orchards. Great care should be taken in planting out trees to see that they are free from bark-lice — with little practice an infested tree can be recognized with ease. At this period they can be scraped off, or a

Digitized by Google

cloth saturated with oil might be passed over the tree and its branches, causing certain death to all bark-lice. An orchard once entirely cleaned of them will not soon become again infested, for the lice spread from tree to tree very slowly, and it is only by an accidental journey on the leg of a bee or a fly that they are introduced into a locality distant from the point of origin, except by the carelessness of man in planting infested trees.

The best remedy known to me is to cultivate and protect the numerous parasites and enemies which wage a continuous war against them. Nearly every species of bark-louse mentioned above is known to be infested with one or more kinds of minute hymenopterous parasites. They are also attacked by many varieties of lady beetles and other predacious insects. One of the most useful of these is a very minute mite belonging to the *Acaridæ*, which attacks those species covered with a scale. The survival of the trees infested with *Pulvinaria*, in Davenport, is undoubtedly due almost entirely to these parasites and enemies. Great care should, therefore, be taken to preserve and protect them.

Of artificial remedies, the simplest is that of "heading in" the tree (*i. e.*, cutting off the branches so as to leave only the trunk and larger limbs), and then removing the lice from the remaining portion by hand or otherwise. This appears to be the favorite method in use on the maples in Davenport, but it does not add anything to the beauty of the trees, though the soft maples stand this severe ordeal very well. This operation seems to succeed best when done in the early summer. On small trees the lice can be removed without much difficulty by hand-picking, or crushing.

In using liquid applications several facts must be taken into consideration: 1st, the effect on the bark-lice; 2d, the effect on the parasites and enemies; 3d, the effect on the tree; 4th, the cost. Under the first head I made a few tests, of the effects of various chemicals, such as I happened to have at hand, upon the young larva, egg-nests, and adult females of *Pulvinaria innumerabilis*, and as a result I may state that alcohol and spirits, chloroform, ether, turpentine or other oils, causes the death of the insect in all stages, even when fully protected by their waxen coats; while water, acids (such as nitric and acetic) and alkaline solutions (such as solution of potash) had no effect whatever even on the young larvæ. Very probably a prolonged submersion in these substances would cause death, but such application is of course not practicable. This subject is worthy of further more careful experiment. Solutions containing soap would do better, as the oily grease

Digitized by Google

would act as a penetrating medium. Under the 2d head it is quite probable that any poison which would destroy the wax-protected bark-lice would also destroy their unprotected enemies. Under the 3d head I have no definite observations to report, the effect on the trees can only be ascertained by experiments which I have not performed. Under the 4th head it is plain that to syringe a tree with alcohol at $2.50 per gallon, even if considerably diluted, would not pay; and so it is with most of the other articles I have mentioned, but probably some oily substances can be found which will be cheaper in their application. The use of oil as a remedy against the bark-lice has long been well known, and was particularly recommended by Dr. Fitch, Mr. Walsh, Mr. Riley, and others.

Miss Emily A. Smith recommends the following plan:* "Charge a fire extinguisher in the usual manner with bi-carbonate of soda and sulphuric acid; add to the water one spoonful of carbolic acid to every eight gallons of water; apply this to the tree and the force from the extinguisher will convey the fluid to all parts of the tree alike." This plan has been tried in Peoria and found a success, the applications being made twice on each tree during the time the young lice are hatching. The cost does not exceed twenty cents an application. Mr. Riley has suggested that kerosene oil be substituted for the carbolic acid, as it would then be effectual even after the waxen coats had formed.† Making the substitution proposed by Mr. Riley, this is probably the best artificial remedy yet suggested. But before undertaking to destroy the lice artificially, first ascertain what the natural enemies are doing, and if these are abundant and at work, it may often be better to let them have their own way, rather than destroy them also, unless there is a fair prosect of completely exterminating the bark lice, both on your own trees and those of your near neighbors.‡

---

* *American Naturalist*, Vol. XII, 1878, page 808.

† *Canadian Entomologist*, Vol. X, 1878, page 177.

‡ Of the many other remedies which have been recommended I will mention three that have come under my notice. Dr. T. J. Iles, of Davenport, in June, 1871, after "heading in" his trees washed the remaining limbs with a mixture consisting of "three gallons each of soft soap and water, one quart of carbolic acid." This appears to have checked the lice for a time, but from some cause the trees finally died. Another gentleman informs me that he has successfully treated his trees by boring holes through the bark and filling them with sulphur. I am at a loss to know how the sap could absorb enough sulphur to kill the lice without injuring the tree itself. I think the lice must have disappeared from some other cause, such as the increase of parasites. On a tree thus treated with sulphur, which came under my daily notice in 1871, there was no apparent effect whatever, either on the tree or the lice. Another remedy which is being continually recommended is the introduction of the English sparrow. This bird was introduced into our city some years ago and is now exceedingly abundant, yet I have never on any occasion seen one touch a bark-louse, or any other insect,—they appear to subsist almost entirely upon the grain continuslly being dropped in the streets.

Digitized by Google

THE NEW CABBAGE BUTTERFLY.

BY ALICE B. WALTON, MUSCATINE.

This spring, in the latter part of May, so far as known, the first specimens of *Pieris rapae* Schrank were captured here in Muscatine. At the same time a friend stated that Prof. Riley claimed to have taken it this season for the first time in Missouri. The fact of the advent of this new white butterfly into our midst may not appear very startling, but the effect will sooner or later prove anything but pleasant to the gardener raising cabbage.

We have always had the common white butterfly. *Pieris protodice* Boisd, which is claimed to be less destructive than the new species (P. rapae.)

Pieris rapae, or Rape butterfly, is an imported species from England, introduced about 1856 or 1857. It was first taken at Quebec in 1859. In 1864 it had spread ever an area around Quebec of forty miles radius. Two years later it was taken in the northern part of Vermont and New Hampshire. In 1869 it was taken around Boston and a few stray specimens in New Jersey, and, finally, ten years subsequent, in 1879, it had made its appearance in Iowa and Missouri. Probably it will eventually spread over all temperate North America, as it will feed upon any of the Cruciferæ or Cress family of plants.

The insect lays its eggs on the under side of the cabbage leaves, and this fact is thought to be the cause of its introduction. It is supposed a few refuse leaves were thrown from some ship. The larvæ or worms hatched, and finding themselves in the vicinity of their food, flourished and grew, thus becoming naturalized. It is also claimed that they are very hardy and easily accommodate themselves to circumstances.

A great many farmers seem to think that this is the same worm, the larvæ of *P. protodice*, which has always more or less troubled the cabbage, but is unusually numerous this summer, but I think not, from the fact that our President, Mr. Witter, has taken these worms from a neighbor's cabbage patch and reared them to the perfect insect,

Digitized by Google

which proved to be the new species, and in collecting during the past season we found the old spieces, *Pieris protodice*, rather scarce and the one, *Pieris rapae*, very abundant for a new species.

It is stated that the larvæ or worms bore into the heart of the cabbage in England and Quebec, whence the French call it "Ver du Coeur" or heart worm, but that is not the way it works in Iowa, for here it eats every particle but the frame work and stouter veins of the leaves.

The larva or worm (*a*) is of a pale green color, about the shade of the leaves, and when full grown is an inch and a-half in length. It then seeks some sheltered spot, as the under side of stones, fence rails, etc., where it fastens itself and changes into a chrysalis, or the pupa state (*b*), which is the second stage of insect life. It winters in this state and in the latter part of the following spring it emerges as a perfect butterfly, deposits its eggs and dies. These eggs hatch in a few days and the larvæ come to perfection about the first of July.

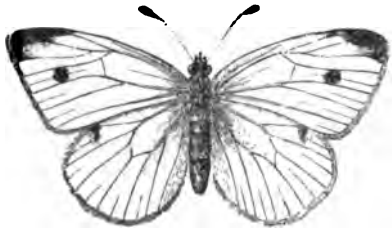
The next brood, the second brood of worms, will be the ones that will change into the pupa, which will hybernate through the following winter as before.

On the wing *P. rapae* is easily distinguished from *P. protodice*. It flies with a slower, more regular motion than *protodice*. It often, especially before settling upon a flower, floats in the air for a distance of three or four feet without moving its wings, while *protodice* always moves with a quick, fluttering motion, though not a fast flyer, and the general effect of the color on the eye is of a whiter shade than that of *protodice*. Both species expand nearly the same, which is about two inches from tip to tip of the wings. The ground color of each is white and marked with black. The markings of the wings differ in the male and female in both species. In *P. rapae* we find the body, head and tips of the fore wings in both sexes black. In the female (No. 1) there are two spots on the outer half of the fore wings, or primaries, and one spot on the hind wings, or secondaries, and also a few scales near the body black.

Digitized by Google

In the male (No. 2) we find the black tips, a spot on each wing, and the black scales near the body.

No. 1.



No. 2.

In *P. protodice* we find the female covered with a great number of black markings, which give it a darker cast than the male. In the male the markings are similar, though not as distinct or as numerous.

The natural history of *P. protodice* is the same as that of *P. rapæ*, except that the larvæ are not as abundant or as destructive.

This year the early cabbages escaped the depredations of this worm, but it nearly ruined the late crop. If we had had a sharp frost about the middle of September it would have been better for the cabbage, as the effect of cold and starvation upon larvæ generally (if far enough developed) is to cause them to change sooner than if the weather continued warm, into the second or pupa state, after which they can do no more harm. Then the growth of September and October would have been of material benefit. It may be predicted that the early crop of next year will also suffer much damage, as great numbers of the pupæ may be collected in the vicinity of every late cabbage patch this fall.

The object in a discussion of an evil is a remedy. Especially is this so in entomology, but a lack of general information and observation of the habits of insects and the cause under which they exist makes it indeed a difficult undertaking or merely an experiment to be tried by those who are affected by it.

It is possible, and really probable, that a person by taking advantage of the habits of this insect could protect a cabbage patch from its ravages. The life of the butterfly is short and as it dies soon after laying its eggs, I do not think its life could possibly be more than two weeks' duration, and as nearly all of a brood arrive at maturity almost simultaneously, a great many eggs might be saved from the cabbage by having a small boy with a butterfly net (made of mosquito netting fastened to a hoop and pole) stand guard for two or three weeks and

Digitized by Google

capture all the white butterflies that enter the patch. As there are two broods a year, with a little observation the approximate time of appearance (for it varies according as the season) could be determined, and then the boy could be set to work. If a few eggs were deposited and hatched, a few would be easier destroyed than millions. That patch would then be safe until the next brood of worms matured.

There is another habit of the insect of which, if we took advantage, a great many might be destroyed.

Every insect in the course of its life passes through four stages: 1st, the egg; 2d, the larva, which is the worm, caterpillar, or maggot state; 3d, the pupa, this is the cocoon or chrysalis state; 4th, the perfect insect. Now our insect, as aforestated, before changing from the worm to the pupa, leaves the food plant and seeks a sheltered spot. If we could fix a trap near the cabbage for them to change under, we might collect and destroy a good many of their pupæ. I have seen the following plan given which was claimed to work well: Between the rows of cabbage place boards raised about two or three inches from the ground by several little blocks or supports. The worms will crawl upon the under side of the boards and change. The board can then be turned over, the pupæ collected and destroyed.

As nearly if not everything in nature has one or more known enemies, our subject forms no exception to the general rule and has at least one known enemy; a small, almost microscopic, whitish maggot, which is likely the larva of a small parasitic fly. I do not know for a certainty the natural history of this maggot, but the egg is probably laid by the fly in the body of the worm when nearly mature and when it changes to the pupa, the maggot has hatched and begun preying upon the worm or the pupa. There are often a good number of these maggots found in one pupa, which destroys its life and thus becomes beneficial.

Digitized by Google

REPORT ON NOXIOUS INSECTS.

BY DR. AUG. W. HOFFMEISTER, FORT MADISON.

Another insect, comparatively new to this continent, has at last made its appearance, and is doing great injury in our State, having traveled in the period of twenty years from Canada to Iowa. The injury, though not directed to either of the small or larger fruits, but to the cabbage family, is so severe as to have caused great alarm to gardeners.

This insect is the *Rape butterfly (Pieris rapæ).*

In the fall of 1878 I discovered the first few Pieris rapæ in this vicinity. There were only a few specimens along the railroad track, and they could be easily distinguished, even in the distance, by the difference in flight from their native relatives, the Pieris protodice.

In the spring of 1879, though few yet, they already outnumbered the Protodice, showing that they were a hardier race, and during the summer, increasing so fast that there were at least five to one of Protodice.

Cabbage and allied vegetables had to suffer to a very great extent from the ravages of the larvæ of this butterfly, so much so, that these vegetables proved to be an entire failure in many gardens, where hand-picking was neglected, or where chickens had no access.

It was very remarkable, that while around Fort Madison this butterfly was very numerous, it had not reached certain localities six or eight miles in the interior of the country not connected by railroad with that place.

This butterfly was first taken on this continent near Quebec, in the year 1859, having been probably introduced in the egg state with cabbage, or which is more likely, in the pupa state, from Europe.

The larva are in the habit of leaving their food-plant, when matured, and attaching themselves to fences, houses, etc., in sheltered positions, to pupate. If such happens on a vessel or railroad car, it is easy to perceive how the pupa can be carried long distances.

Digitized by Google

The larva of this butterfly when fully grown is about 1¼ to 1½ inches long, narrowing at both ends, of a pale velvety green, with a yellow stripe along the back, and yellow spots almost forming a stripe on each side, and covered with very short, soft, and fine hairs, almost invisible to the naked eye. When matured it selects a suitable position to pupate, spins a silken patch on the object of selection, into which it fastens the hooks of the anal legs, then spins a loop over its back, a little forward of the middle, and fastens it on each side to the object of choice, after which it remains half a day or more, either horizontally or vertically suspended, during which time the head is drawn more or less towards the front legs, and the segments nearest the head swell considerably. In due time the skin of these segments and the head splits on the back, and a green pupa wriggles out of this split which, after fastening its anal hooks in the tuft of silk, lets go the skin which falls to the ground. After some time the pupa has assumed proper form and color, with a short pointed projection in front, and a sharp nose-like protuberance on the back, the green has changed to a grayish flesh color with darker dots. There are several broods which will overlap each other in the year. The last brood will winter over in the pupa state, and emerge as butterfly early in the spring.

The food-plants of this caterpillar are curciferous plants, especially the cabbage tribe, though I found a few on Reseda odorata, or Mignonette. On the cabbage they do not work on the outside, but between the leaves to a greater or a lesser depth, and care should be taken in preparing this favorable article of vegetable for the kitchen, not to get any of the hidden worms with it.

The Caterpillars or larvæ are hatched from eggs similar in appearance to the eggs of the Colorado Potato Beetle—not quite as large. They are pointed at each end, the smallest of which is glued to a leaf of the food-plant; when freshly laid, of a lemon yellow color, but when older they assume an orange color.

The perfect insect or butterfly is about two inches in expanse; the body is black, covered with white hair scales; the wings are white; the front wings have a black patch at the point, larger in the female than in the male; besides this black patch the female has two round black spots near the outer margin of the fore wings, while the male has only the first one of these two spots on the upper side, yet the lower or under side shows both of them. The hind wings have on the front margin, near the anterior angle, a three-cornered black spot. Around

Digitized by Google

the body, extending along the front margin the farthest, are fine black scales intermingled with the white, which gives this part of the wings a bluish appearance. The under side of the wings are similarly marked to the upper side, only the hind wings have a yellowish tint.

Though like other immigrated insects, a great pest at first, we need not be very much alarmed that it will remain so. True, we will have this butterfly now forever, but with due care and some labor it will not be so destructive for any length of time as it proved to be here this season. It has an enemy, which will likely keep it in check, and neither the cabbage nor the sour krout need be missing on our tables. This enemy is a little black fly belonging to the family of Chalcididae, order Hymenoptera, and is likely the Peteromalus vanessae, Harr. In Europe the Peteromalus puparum has the same habit. This fall I found some twenty-five or thirty pupæ of the Rapæ butterfly on my windows or under the roof, suspended there for hybernation. I instructed my boys to destroy them, but they answered that they had already intended to do so, but had desisted from it, as the pupæ were filled with Ichneumon flies. I then examined one, and found fifty-four pupæ of the above named Pteromalus fly in it. Chickens and turkeys are very expert in finding the larvæ, and if they did less like the cabbage themselves, should have free access to the cabbage patch.

Some papers have advised to sprinkle salt, ashes, and air-slaked lime on the cabbage plants. None of these will destroy or keep all larvæ off. Paris green is entirely out of question, as it would poison the cabbage. Hand-picking, and letting the chickens in once in a while, so long as they prefer the larvæ to the cabbage, will be the most efficient means of keeping this insect in check. Besides this, the butterflies should be caught in nets, made from musquito bar or other light fabric, around hoops, say twelve inches in diameter and on poles three to four feet long, or in the evenings when they sit still on the under side of plants in the garden. Many of our small birds feed their young with these larvæ (our Chippi, for instance), and these birds should not only be tolerated, but encouraged to build in or around our gardens.

Our grape crop was good this year, and would have been very good if it had not been for what I thought (but afterward doubted) to be the grape seed curculio.

About the 21st of June the work of this insect was first noticed in this vicinity, and lasted until about the 13th of July, when no more fresh punctures were observed. Though I hunted attentively for the

Digitized by Google

perfect insect, and beat the vines over white sheets, I was unable to find any insect likely to have done the work.

About the time mentioned some berries of the Concord showed a puncture on the side. Soon after, around the puncture, the skin became discolored and flat; the track of the young larvæ could be discovered leading toward the kernels, and in more advanced specimens pass around the kernels; but, though some of the seeds were gnawed on the outside, I never could detect the larva in the seed itself. The larva was found always around the seeds in the frass. It was a very small white or pinkish grub, and undoubtedly the larvæ of a snout beetle.

The punctured berry would invariably fall to the ground of its own accord—as the plum when infested with the plum curculio—or when the vine was slightly shaken. It was astonishing how many berries were punctured. My neighbor, Mr. Wasserzieher, collected from about 600 Concord vines twelve bushels of grapes. He collected the fallen grapes every day and boiled them for his chickens and hogs. My vineyard, not kept in so good a condition—I planted apple trees in it and let it run in grass—as Mr. Wasserzieher's, from which it is only about one-eighth of a mile distant, was not so much attacked, neither were other vineyards; but all suffered more or less.

I tried to raise the perfect insect, but failed, as I neglected to keep the ground in the breeding jar moist enough, but hope to be able to succeed next year.

ENTOMOLOGICAL REPORT.

BY HERBERT OSBORN, AMES.

INSECTS WORKING ON APPLE.

To the Iowa State Horticultural Society:—In my report of last year I took up a number of insects particularly injurious to the apple. During the past year a number of others have come under my notice, and hence it may be proper to introduce a few notes with regard to them,

Digitized by Google

and to so expand the key by which the apple insects may be more readily determined, as to include all that are at present known to be of importance in our State.

In order to make this key plain to all, even without any knowledge of technical terms, I have avoided structural characters and taken the habits as the basis of classifying.

During the spring I examined specimens of the Oyster-shell Bark-louse (*Mytilaspis pomicorticis*) for the purpose of ascertaining if possible, to what extent the parasitic mite (*Acarus malus*) was distributed.

Though I did not receive specimens from as many localities as was desired, and I hope it was because they could not be found, I had the satisfaction of finding in every case that the mite was actively at work and in some cases had so thoroughly accomplished its mission as to leave scarcely any of the lice.

During the summer and fall the Fall Web-worm (*Hyphantria textor*) was unusually abundant, both in orchards and upon forest trees: Especially did I find this the case in Linn county, where I spent three weeks in July. Even the Osage and Willow hedges were made to pay tribute to its voracity. This is becoming a most grievous pest and demands prompt action. Though easily cleaned from an orchard, it cannot be expected that they will cease their work until measures are taken to prevent their multiplication in surrounding thickets or timber. We are too apt to overlook the fact that our wild crab, cherries, plums, and other trees or shrubs related to our cultivated ones, are supplying us with hosts of noxious insects.

KEY TO APPLE INSECTS.

A ATTACKING THE ROOTS.....Apple Root-louse.
B ATTACKING THE TRUNK AND BRANCHES.

(a) Internally, boring in the wood.

(1) At or near surface of ground..... .....Round-headed Borer.
(2) Usually in upper trunk or branches..... Flat-headed Borer.
(3) In the twigs.....Apple Twig Borer.

(b) Externally gnawing the bark.

(1) A hairy beetle.....Indian Cetonia.
(2) Ash gray snout beetle.....New York Weevil.
(3) A hairy caterpillar.....Lappet Moth.

(c) Immovably fixed to bark.

(1) Mussel shaped scale ....Oyster-shell Bark-louse.
(2) Irregular flat scale..... ....Harris Bark-louse.

Digitized by Google

(d) Piercing and laying eggs in twigs.

(1) In summer.....Seventeen-year Cicada.

(2) In fall.....Snowy Tree Cricket.

C ATTACKING THE LEAVES.

(a) Gregarious.

(1) Protected by a web. Caterpillars.

* Feeding outside, spring.....Tent Caterpillar.

* Feeding within the web, summer.....Fall Web-worm.

(2) Not protected by a web. Caterpillars.

* Yellow band back of head.....Yellow-necked Caterpillar.

** Red hump on fourth ring.....Trim Prominent.

*** Horn on fourth ring.....Unicorn Prominent.

(3) Green wingless bugs clustered on the under side of the leaves and sucking their food, Plant-lice. Apple Aphis.

(b) Solitary or scattered promiscuously.

(1) Protected.

* By web over a single leaf.....Leaf Skeletonizer.

** In tortuous tube.....Leaf Crumpler.

*** In folded leaves. Leaf Rollers..... { Lesser Apple Leaf Folder. / Green Apple Leaf Tyer.

(2) Unprotected.

* In spring.

† Working in the day time.....Canker-worm.

†† Working in the night.....Cut-worms.

** In summer. Caterpillars.

† Large, green, covered with spiny tubercles.....Cecropia.

†† Apple green, striped obliquely on sides with white.....Silk-worm.

††† Similar to above, but with bluish caudal horn. Blind-eyed Sphinx.

†††† Green above and pink below.....Larva of—Turnus Butterfly.

††††† Hairy, long tufts over head and tail.....White-marked Tussock.

††††† Very small green worm.....Apple Bucculatrix.

*** Small yellowish beetle.....Rose chafer.

D ATTACKING THE BUDS.

(a) Eating them out, also cutting off leaves.....New York Weevil

(b) Piercing them with sucking tube and causing them to wither and drop.....Tarnished Plant-bug.

(c) Living within the bud before it opens.....Leaf-Rollers.

E ATTACKING THE FRUIT.

(a) Eating channels through it .....Apple-worm or Codling Moth.

(b) Gouging into it for food. Snout Beetles.

(1) Two humps on the back.....Plum Curculio.

(2) Four humps on back part of back.....Apple Curculio.

(3) Without humps.....Plum Gouger.

Digitized by Google

THE TURNUS BUTTERFLY.

(*Papilio turnus.*)

This beautiful butterfly, quite abundant throughout the State, is seldom considered of an injurious character, and indeed, as usually seen it is a most inoffensive creature, but as its larva feeds upon apple as well as wild cherry, thorn, etc., it is evident that its increase might be destructive to our orchards.

The full grown caterpillar is described as from two to two and a-half inches in length, of a green color above, with light dots in rows, and a yellow eye-like spot, with a black center, on each side of the third segment, a yellow band across the fourth segment, and the head, under side and legs pink. The chrysalis brown with a conical point on the breast.

The butterfly expands about four inches. It is light yellow, and the wings have a wide black margin, containing yellow spots, also bars of black running back from the front edge of the upper wings. The under wings have prominent tails behind.

The natural checks will probably remain sufficient to keep it in bounds. Were it to multiply largely, the caterpillars could be hand-picked, and a small boy with a net would catch the butterflies readily, so there is no cause for alarm.

THE BLIND-EYED SPHINX.

(*Smerinthus excæcatus.*)

Like the preceding, this insect need give us no alarm, but if only the very injurious ones were described, and their habits given, we would not know what to expect of the occasional visitor if found working in a destructive manner. The caterpillar is distinguished from other large green ones similar in appearance, by having yellowish white lines running obliquely on the sides of seven of the segments, and a bluish horn on the top of the last segment.

The moth is rich brown; the fore wings are crossed by two bands of lilac gray, and the outer edge is notched; the hind wings are brownish near the margin, rose colored near the body, and have a black eye-like spot, pupiled with blue, near the anal angle. The wings expand about three inches.

Digitized by Google

THE YELLOW-NECKED CATERPILLAR OR THE HAND-MAID MOTH.

(*Datana ministra.*)

This fortunately is not a very frequent visitor, but it makes clean work where it does operate. I noticed that a cluster of them were entirely stripping a good portion of a fair-sized tree upon the College grounds last season. The caterpillar is glossy black with four narrow, nearly white lines upon the sides. Just back of the head is a yellow band on the upper side, from which the caterpillar derives its name. The body is thinly covered with rather long, white hairs. Varieties feeding upon other trees are said to differ from the one feeding on apple, but I have not had the opportunity to examine but this one for myself. The moth has reddish or russety brown fore wings, crossed by four lines of darker brown, an indistinct line between the third and fourth of these, also a faint wavy line near the tip. The hind wings are without marks and lighter than the fore ones. The head and a part of the thorax dark reddish brown, and the rest of the body of the color of the wings.

This insect seldom becomes so abundant as to need special attention and when it does its gregarious habit renders it at once subject to attack. The caterpillars feed close together, and during the moulting periods cluster together on the trunk or lower branches, when the whole colony may be destroyed at once, either by crushing or burning.

THE TRIM PROMINENT.

(*Notodonta concinna.*)

This insect is similar in habits to the preceding, with the exception that when not feeding the caterpillars gather on the twigs and small branches. They more frequently become a serious pest, but may be easily attacked in much the same manner as for the preceding.

The caterpillars are quite different, being distinguished by a red head, a red hump on the top of the fourth ring, and the color yellowish brown, paler on the sides, marked with slender black lines; there are several short black spines along the back. The hinder end is tapering and is elevated when the caterpillar is not crawling. They work usually in August and September, the moth appearing in July of the following season. The eggs are laid on the under side of leaves,

Digitized by Google

a single moth laying a great number, so where the caterpillars appear they are usually very abundant.

The moth is described as light brown in color; the fore wings dark brown along the hind margin, and more or less tinged with gray before, a dark brown dot near the middle, a spot of the same color near each angle, a very small triangular, whitish spot near the shoulders, and several dark brown, longitudinal streaks on the outer hind margin. The hind wings of the male are brownish or dirty white, with a brown spot on the anal angle; those of the female are dusky brown. Body light brown. Expands from an inch to an inch and a quarter.

THE UNICORN PROMINENT.

(*Notodonta unicornis.*)

This species is very similar to the preceding, and may be attacked with the same methods. The caterpillar has, instead of a red hump on the fourth ring, a prominent projection rising in the shape of a horn and sloping forward a little. The head is large and brown and the sides of the second and third rings green; the rest of the body brown, marked with white on the back.

Harris describes the moth as follows: The fore wings are light brown, varegated with patches of greenish white and with wavy dark brown lines, two of which inclose a small whitish space near the shoulders; there is a short blackish mark near the middle; the tip and the outer hind margin are whitish, tinged with red in the males; and near the outer hind angle there are one small white and two black dashes; the hind wings of the male are dirty white, with a dusky spot on the inner hind angle; those of the female are sometimes entirely dusky; the body is brownish, and there are two narrow black bands across the fore part of the thorax. Expands from an inch and a-quarter to an inch and a-half.

THE VALLEDA LAPPET MOTH.

(*Gastropacha valleda.*)

Specimens of this peculiar insect were captured by Mr. Schrader, a student in the college, last year. The caterpillar is hairy and fits closely to the bark of the apple tree upon which it feeds, so it may easily be mistaken for an excrescence on the bark.

The moth has a white thorax with a brown stripe on the back, and

Digitized by Google

the abdomen is dark gray. The fore wings are gray crossed by white wavy lines. The hind wings lighter gray with an indistinct light band across the middle and a white band near the margin. The body is quite hairy. This insect has never become numerous enough to be very injurious, and were there any danger that it might, could be easily checked.

LEAF-ROLLERS.

(*Tortricidæ.*)

Owing to lack of time I was unable to give these little pests any amount of attention during the past season, and therefore can present nothing new about them. Their importance demands a careful investigation into their habits, and such an investigation is a work of time. I hope to be able to devote more attention to them the coming season.

In order to give all the assistance possible to those who may wish to study into their habits, I will copy the descriptions of two of the best known species, as given in the report of the State Entomologist of Illinois, for the year 1877.

TORTRIX MALIVORANA, Le Baron.—The Lesser Apple Leaf Folder.

In his first report, Dr. Le Baron describes this insect as a "pretty little bright orange, round-shouldered moth, the larva of which is a small, greenish, naked caterpillar, with a pale, amber brown head and whitish incisions. In some specimens the whole caterpillar is of a pale brownish tint. Usually one caterpillar, sometimes two or three, eats off the upper cuticle of the leaf, curling the two sides upward till the edges nearly or quite meet, and tying them together with a web. In this enclosure the little caterpiller goes through its transformations." The worms from which Dr. Le Baron obtained his moths were found on the fruit farm of Mr. D. B. Wier, of Lacon, and seemed to never have been sufficiently numerous before to attract attention. There are two broods in a season, the first brood of moths making their appearance and depositing their eggs in the folds of the young leaves just as they open; the second brood appearing the latter part of July, depositing their eggs upon such leaves as had not been injured.

Remedies.—The remedy suggested by Mr. Wier consists in looking over the trees for the rolled up leaves, and destroying them before the first brood of worms change to moths, before the middle of July. As the insect had not been injurious previous to 1870, and as the second brood of the next year did very little damage in Mr. Wier's orchard,

Digitized by Google

we may suppose that climatic changes and insect parasites will usually render other means of fighting them unnecessary.

Spec. Char. of moth.—Length .30 of an inch, expanse of wings .50 of an inch, antennæ brown, annulated with whitish on each joint, most distinctly on the under side, first joint densely clothed with orange scales; palpi orange, horizontal; the scales project around and beyond the end of the penultimate joint so as to form a little cup in which the small ultimate joint is inserted; maxillary palpi rudimental; tegulæ well developed, more than half as long as the thorax; head, thorax, and fore wings bright orange; the orange scales which cover the wings are observed, when carefully examined, or seen through a lens, to be mixed with numerous whitish, almost silvery scales, so arranged as to form about ten indistinct, transverse sinuous or wavy lines. Hind wings, abdomen, and legs whitish with silken lustre. There is a little plume of divergent scales at the end of the abdomen. —LeBaron.

TORTRIX CINDERELLA, Riley.—The Green Apple-leaf Tyer. The larva of this little gray moth may often be found, with several other species, in company with the Leaf Skeletonizer, aiding in denuding young apple trees of their foliage. The caterpillar is of a uniform yellowish green color, with the head and neck horny, and of a slightly more tawny color. The head is marked with a crescent-shaped black mark, on which are the eyelets, and another dusky spot at the base on the sides. "Like the preceding species, it lives and undergoes its transformations within a leaf folded and fastened with silk. It may be known from the Skeletonizer by its wriggling away and dropping to the ground when disturbed, which the Skeletonizer does not do. The moth expands half an inch, has the front wing ash gray without spots, while the hind wings are paler. The same remedies that would apply to the Leaf Skeletonizer would apply here.

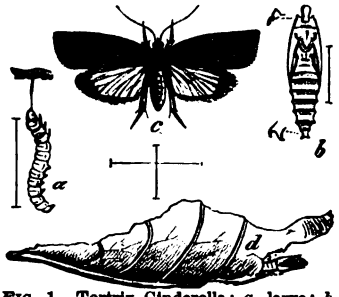


FIG. 1. Tortrix Cinderella; *a*, larva; *b*, pupa; *c*, moth; *d*, folded leaf with head of worm protruding.

Spec. Char. of moth.—Expanse of wings .50 of an inch. Fore wings deep glossy, ash gray, immaculate. Under a lens they have an irrorate appearance, while in certain lights some of the scales appear to form a series of darker, transverse, sinuous lines; also scat-

Digitized by Google

tered over the wing may be noticed a dozen or more reddish scales, which are not sufficient, however, to destroy the uniform immaculate appearance. Head, mouth parts, antennæ, legs, and abdomen of same color. Hind wings paler and semi-transparent. Fringes of all wings concolorous.—Riley.

THE ROSE CHAFER.

(*Macrocdactylus subspinosa.*)

This beetle has never to my knowledge been so great a scourge in our State as in many others, but its appearances are so irregular and sudden, and its destruction at such times so great, that it demands a notice in this connection. Dr. Harris seems to have been the first to give a full account of its life, history, and habits, and I can do no better than to draw upon his work for these notes.

"This beetle measures seven-twentieths of an inch in length. Its body is slender, tapers before and behind, and is entirely covered with short and close ashen-yellow down; the thorax is long and narrow, angularly widened in the middle of each side, which suggested the name *subspinosa*, or somewhat spined; the legs are slender, and of a pale red color; the joints of the feet are tipped with black, and are very long, which caused Latrielle to call the genus *Macrodactylus*, that is, long toe, or long foot. They come forth from the ground during the second week in June, and remain from thirty to forty days; at the end of this period the males become exhausted, fall to the ground and perish, while the females enter the earth, lay their eggs, return to the surface, and after lingering a few days, die also." Each female lays about thirty eggs, which hatch in about twenty days. The grubs feed on tender roots and remain in this stage over winter. In spring they change to pupæ and the perfect beetles issue from the ground, as before stated, about the second week in June. It is thus protected from any method of attack, except while in the perfect stage, and then the well known plans of hand-picking, shaking upon sheets, etc., must be practiced. I should suppose the use of Paris green, Arsenic water, London purple, or other poison, would be fully as efficacious for this pest as for the Colorado Potato Beetle, and many other injurious insects.

THE INDIAN CETONIA.

(*Euryomia Inda.*)

Last summer I received a specimen of this common beetle from Mr. A. J. Haviland, of Ft. Dodge, with the statement that it was doing

Digitized by Google

much damage to the apple trees by gnawing off the bark, and that one tree had been entirely ruined. The portion of branch sent with the insect shows this work to be truly damaging, reminding one very forcibly of the girdling done by rabbits and mice. This seems to be a new feature in the habits of this beetle, no such instance that I can find being on record. It is a very general feeder, Harris giving the pollen of the Golden Rod, the sap of cornstalks and locust trees, and especially ripe peaches, to which it is very destructive, as the food it commonly seeks.

Further observations upon its food will be very interesting as well as useful, and I desire to hear from any who may notice it. The beetle is from a half to two-thirds of an inch in length; of a yellowish-brown color, and the wing covers are sprinkled all over with small irregular black spots. These wing covers are quite flat and do not extend down upon the sides of the body, as is usual in the beetles. It is seen early in spring and again in September, and flies with a loud humming noise, similar to a bumble-bee.

THE TWIG BORER.

(*Bostrichus bicaudatus.*)

This borer which is more or less abundant with us nearly every year is held in varied esteem by different parties, some claiming that its pruning is rather beneficial than otherwise, while some are of the opinion that it should be checked. This point may be left however to the decision of those who meet it in their orchards, as doubtless it depends largely upon the condition of the trees, their age and the numbers of beetles that may attack them. It only remains for me to describe its work so that the proper remedies may be applied if it is desired to check them.

The beetle is small, cylindrical, dark brown and about a third of an inch in length. The thorax extends over the head like a hood and is rough in front being produced into two little horns. The wing-covers are furnished in the male with two little horns behind.

These little beetles bore into the twigs of the apple, and to some extent also in other wood, the grape being frequently so attacked. It usually starts just above a bud or fork and bores downward. The holes are made for protection during the winter, or for food as they are not used to breed in. The twigs thus bored usually break off or die the following season.

Digitized by Google

As the beetles are in the twigs during the winter and early spring, and as the next generation depends upon these, some effect may be made upon its numbers by carefully cutting off and burning the infested twigs with their contents.

THE NEW YORK WEEVIL.

(*Ithycerus noveboracensis.*)

Through the Hon. C. F. Clarkson, specimens of the above insect were received last spring, with the statement that they were seriously injuring apple trees. It is a snout beetle, ash gray in color, the wing covers being marked with dotted black lines, and differs from most of the snout beetles in having the antennæ straight instead of elbowed. Early in the season it attacks the bark, gnawing it off and thus killing the twig, and later it eats out the opening buds or entirely devours the tender shoots. It will also gnaw off the stems of the leaves after they have expanded. Altogether it is quite a serious pest when present in abundance. Like the curculio it may be shaken from the trees and thus captured.

THE TARNISHED PLANT-BUG.

(*Capsus oblineatus.*)

This insect has attracted more than usual attention in our State the past season. Last April I received specimens and a request for information concerning it from Mr. Silas Wilson, of Atlantic. He says they did great damage to the fruit crop in that locality by destroying the blossom buds, and that they were especially destructive to pears. Mr. H. C. Raymond, of Council Bluffs, also writes me that it was very plenty with him, and in Harrison county, and localities east and south. He believes it was the principal cause of failure in the fruit crop. Both of these gentlemen speak of it as particularly injurious to the Ben Davis apple.

I noticed it here a number of times during the season, but not doing any perceptible amount of damage. It feeds on a great variety of plants during the spring and summer, and it is only at the time of the buds bursting when it collects largely on fruit trees, that it is noticed as so destructive. It belongs to the order of true bugs (*Hemiptera*) of which the chinch-bug is a familiar example, and in some respects is similar to this well known pest. It is about one-fourth of an inch in length, and varies in color from light to dark brown; there

Digitized by Google

is a yellow V usually present on the triangular piece on the back behind the thorax.

The bugs as seen in spring have passed the winter protected in all sorts of sheltered places, such as rubbish, weeds, etc., which may have accumulated during the previous season. They deposit their eggs on various plants and the young bugs will be found along with the old ones during the summer. In this they exhibit the same habit as the chinch-bug. Prof. Riley thinks it probable that two generations are produced during the season. Before winter they are all full grown and ready to seek shelter till the next spring. It then becomes an important matter to the orchardist to see that no such shelter is available to them, or at least that all rubbish that can be, is removed from the orchard, and if they have already hidden themselves for the winter the rubbish, dead weeds, etc., may well be made their "funeral pile." By keeping weeds down during the summer the bugs will find less food to assist their multiplication, and thus they may be influenced indirectly. Little can be done directly since they feed on such a variety of plants, and fly readily if disturbed. I know of no practicable method by which to prevent their attacks upon fruit buds. The matter is open for experiment, and I hope those who are interested and can do so, will do what they can to discover some available means of fighting an insect so important.

ON A SPECIES OF PLANT-LOUSE INFESTING THE SCOTCH PINE—HISTORICAL.

With a few exceptions the various conifers which we are able to grow in this prairie region are exempt from the attacks of destructive insects. It is fortunate that such is the case for with the majority of them it requires all their vitality to withstand the effects of the climate and attain even mediocrity in growth.

The exceptions referred to are mainly due to certain Plant-lice and Bark-lice. Of these, the species which forms the basis of this paper, presents many points which make it especially worthy of attention. It appears to have received but little attention from entomologists, whether from seeming of little importance to them or from simple oversight I am unable to state. It was first described by Dr. Fitch, the State entomologist of New York (Transactions of New York State Agricultural Society for the year 1854, page 871) under the name of *Coccus pinicorticis*,* and since that time seems to have been almost

* Dr. Fitch's description however is very meagre, he having observed but one form of the insect, and his description of this form so general as to leave many points in doubt. It will be referred to further on.

Digitized by Google

entirely ignored by the entomologists of the country. Prof. Riley barely mentions its name (using the generic name *Chermes* however to which he informs me the insect described by Fitch properly belongs), in describing the parasite of the Pine Scale Louse (*Coccus pinifoliæ, Fitch*), and of the Grape Phylloxera (*Phylloxera vestatrix*, Planchon).

It has been working for the last two years on the Scotch Pines on the college grounds, and even a hasty examination, will show to any one that it is decidedly injurious in its habits.

So far as has been determined these insects do not, like the Oyster-shell Bark-louse, and many other species, present a distinct time for hatching, migrating and laying eggs, but their multiplication is irregular, the various processes being carried on more or less continuously, in this resembling more closely the Aphides which infest various plants, and it seems more than probable that like them this species also multiplies very considerably by partheno genesis.

The observations which have extended during two years show considerable variation, which is probably due to difference in the seasons, to the presence of parasites or some similar cause.

A table of brief extracts from my notes for the two years will show this plainly. These notes, however, were not sufficiently connected and frequent to be of the greatest value, owing to lack of time for the proper observations.

For 1878 the observations began about the middle of April when the eggs and adult females were found in downy balls attached to the outer twigs and branches, and somewhat on the trunk.

From 20th to 24th—Eggs hatching rapidly and larvæ traveling.

May 6th—Larvæ have grown to twice their original length, fastening to the bark of the new growth of twigs by their sucking tubes.

May 13th—Becoming densely covered with wooly substance.

May 21st—Winged males noticed for the first time, these very abundant.

June 3d—Winged males have disappeared; a few newly hatched larvæ noticed.

June 10th—Lice have almost entirely disappeared.

After this none were noticed during the summer, but I think that examination in the fall would have shown their presence as adult females. It should also be noticed that in the table note is made for the majority of insects observed in any particular stage, while they were found in small numbers in other stages at the same time. Thus newly

Digitized by Google

hatched larvæ were found more or less plentifully in all the observations of the early part of the season, though their presence was hardly noticeable owing to the immense number found in other stages.

For 1879 the notes begin with May 7th, when the lice were found covering the new growth of twigs, just started, and also somewhat on the old wood.

May 13th—Lice well developed, some destroyed by parasites, egg clusters also present, unhatched.

May 14th—Damaging severely the new growth of wood, egg clusters plentiful.

May 16th—Young hatching and traveling.

May 21st—Egg clusters, newly hatched larvæ and winged males.

May 27th—Egg clusters and living females on new growth of wood.

October 9th—Adult females abundant, a few eggs, also occasionally a larva.

It will be seen by comparing these notes that there is far less of regularity in the latter year than in the former, though the times of some stages agree remarkably. In both years the date of noticing the winged males as most abundant is the 21st of May; so there seems in this stage to be a limited time of appearance which occurs with regularity. As to the state in which they pass the winter, I think it will be found to be both as adult females and unhatched eggs, and that their successive multiplication is simply arrested at this point, to be resumed where stopped, at the return of warm weather and proper conditions.*

It is true that such a mode of continued reproduction does not exactly agree with that shown by the majority of insects in this group, where the perfect winged forms occur as the last generation in the fall and the asexual viviparous reproduction of imperfect females begins in the spring from the eggs of the perfect fall forms. But in a group presenting such wonderfully diverse characteristics we need not be surprised at slight variations in this respect, and when we consider it, the appearance of the males at one season of the year instead of another, or the production of eggs instead of living individuals, is not of so much consequence as to cause us to reject this view. Further-

* An examination of the trees in the middle of January, 1880, showed the lice quite numerous and apparently in good winter condition. No eggs were found, but the living wingless females seemed the only hope for the coming year. It is hardly possible that the larvæ and eggs noticed late in the fall could have come to maturity, but still their appearance at that time would seem to show that reproduction is continued till checked by winter.

Digitized by Google

more this insect agrees in this respect quite closely with the Phylloxera to which it presents some remarkable affinities, and is doubtless nearly related.

DESCRIPTIVE.

THE EGGS found in the downy balls vary from five to sixty, or more, in number; usually, however, they are few. They are yellowish, slightly ovate, with a longitudinal diameter of .34 millimeters, and transverse diameter of .17 millimeters. In development the mouth parts are first apparent (Plate I, Figs. 11–14)* and afterward the antennæ and legs appear, these being fully developed by the time the larva breaks the egg crust.

THE LARVÆ (Plate I, Figs. 1 and 2) are oval in shape, flattened, yellowish or light brown. (Prof. Riley says† purple-red, but I have not been able to detect this color.) Head semi-circular, with the eyes on the circumference, near the posterior margin. The antennæ are three-jointed; the first joint is short and thick; the second is slightly longer, and not so thick; the third is three times as long as the first, and half as thick, set with a few stiff hairs at the apex, one being two-thirds the length of the joint; also a few lateral hairs. Near the end of this joint are a few transverse marks or ridges, extending part way round.

The mouth parts (Plate I, Fig. 10) are well developed; there is a long sucking tube, twice the length of the body, enclosed in a sheath extending under the body nearly to the end of the abdomen. The sucking tube at its end is easily reduced to three parts, possibly four, while at the base the four normal parts are easily distinguished. The sheath is apparently four-jointed, sparsely set with stiff hairs, mostly at the apex; the legs are of moderate length, coxa short and thick; femur and tibia equal; tarsus one-jointed, half the length of the tibia, ending in two short ungues surrounded by digituli (knobbed hairs). There is a short hair or seta on the outer angle of each abdominal segment. Length .38 millimeters; width .19 millimeters; antennæ .12 millimeters; legs .15–.18 millimeters.

As these larvæ grow they become darker in color, assuming a deep red brown, and finally almost black appearance, while the wooly substance develops thickly on the abdominal segments, and also somewhat on the meso- and meta-thorax, entirely hiding the insect, which thus appears like a ball of white down. This substance develops from gland-like surfaces arranged subdorsally on each segment, the abdominal segments having also a lateral row of smaller surfaces performing the same office.

THE ADULT MALE (Plate I, Figs. 3 and 4) is, when it first issues from the pupa, light reddish in color, the wings are very white, expanding rapidly, and becoming transparent, while the body gradually becomes darker, till nearly black. The antennæ are five-jointed, short; the tarsi are *one-jointed* with two ungues and a cushion-like protuberance at the base, possibly repre-

*I regret that my plates illustrating the structure and different stages of this insect cannot be published in connection with the paper.

†In correspondence of date June 3d, 1879. I think this difference may be due to a difference in the age of specimens examined. My description is from newly hatched specimens, and I find hat the larvæ become darker at an early age.

Digitized by Google

senting a second joint. The wings are four, folding roof-like over the body; the anterior ones being furnished with a strong sub-costal nerve which is branched at one-third the distance from the base, the lower branch running parallel for some distance, then turning obliquely toward the posterior margin; also from this branch two oblique discoidal veins run to the posterior margin. The stigma is indistinct. The posterior wings have a sub-costal nerve, with no branch veins.

THE ADULT FEMALE (Plate I, Figs. 6 and 7) is unwinged, not fixed but enclosed in a wooly mass which adheres to the bark. The legs and antennæ are persistent, comparatively small. The antennæ are three-jointed, and the tarsi one-jointed, terminated by two ungues. The body is elongated, pyriform during egg laying; contracted to globular or flattened afterward, or in winter.

(If there is a winged form of female I have been unable to discover it as yet.)

The newly hatched larvæ, which are so minute as to be almost invisible to the naked eye, when shaken upon a smooth surface in a room lighted by a single window, were noticed to always turn toward the light, and if the surface upon which they were traveling was turned they would alter their course to suit the change. This leads me to think that they may possibly be guided by the light in spreading to the outer and younger twigs, as naturally the stronger light is from that direction. They commence traveling as soon as hatched, and before the downy substance begins to develop upon them. The lice are evidently influenced by exposure, as they will be found usually on certain parts of a tree or group of trees. Dr. Fitch says upon the north or shaded side of the trees and the lower portions, where there is a constant shade, but though I have noticed this as a rule here, I have also observed a peculiar exception. This is in a large group of Scotch pines in which there is an open space. The lice in this case are found in greatest numbers on the sides of the trees next to the space, while on the outer sides they are very few, an instance which would point to the wind as an influence upon their distribution.

The white substance which covers them is waxy and filamentous in character, Dr. Fitch says appearing "like very fine Saxony wool." It is an excellent protection against the weather, both for the females in the winter and for the eggs in the spring, as also for the lice in all stages through summer rains and scorching sun, though I think it probable that continued heavy rains have some influence in lessening the number of lice.

Dr. Fitch says under each tuft he finds a cluster of insects "huddled

Digitized by Google

closely together and fixed to the bark," but I have always found only a single insect, or a female and cluster of eggs in each tuft, and except when feeding as a growing larva, not fixed to the bark. However, I think the female never travels from the spot where it has located as a larva. He also says the insect is "so exceedingly small as to be wholly imperceptible to the naked eye, and is discovered with difficulty, even when the eye is aided by a magnifying glass," also, that "the larger individuals are little over the hundredth part of an inch in length, and smaller ones are associated with them not half this size," while it seems an easy matter to see the *eggs* even with the naked eye, they being as given in the description more than a third of a millimeter in length (about 1-75th of an inch). As he states that he had not discovered the winged individuals, and as he does not mention the larvæ, it seems that he had only adult or partly grown wingless specimens to describe from. Another slight variation is that he observed them upon white pine and most numerous upon the trunk, while I find them almost entirely upon the Scotch pine, not even working upon white pines that stand beside the Scotch, and by far most numerous on the small twigs. These variations must be due to the climate in part, or it may be that Dr. Fitch observed them only at one time of the year, or in an exceptional locality.

CLASSIFICATION.

Dr. Fitch, who first described this species, gave to it the name of *Coccus pinicorticis*, thus placing it among the Coccidæ. Prof. Riley, however, states that it really belongs to *Chermes*, which is an Aphidian genus. The majority of principal characters seem to place it without question among the *Aphidæ*, though a few are dissimilar. I think, however, that this is largely due to the difficulty of defining groups so as to include all the species which may properly be embraced in them. This insect presents a remarkable example of a species possessing strong characters belonging to two distinct families and some which exclude it from both. It shows, also, the unsatisfactory state of the classification as yet arrived at for these aberrant groups. A short review of these groups, as at present limited, will serve both to indicate most nearly the proper situation of the species in hand and to show the imperfect state of the present arrangement.

Westwood, in his "Classification," divides the HOMOPTERA into three sections, *Trimera*, *Dimera* and *Monomera*, based upon the number of joints in the tarsi. The first, *Trimera*, is a very well defined group containing the Cicadas and a few other well known insects, therefore it needs no further mention. The second section, *Dimera*, contains the three families, PSYLLIDÆ, APHIDÆ and ALEYRODIDÆ, characterized by having two joints in the tarsi with antennæ longer than the head, composed of from six to ten

Digitized by Google

filiform joints, and differs particularly from *Monomera*, by having four wings. The third section, *Monomera*, containing the single family COCCIDÆ, is characterized by having a single joint in the tarsus terminated by a single unguis. The males possessing a single pair of wings and furnished with two very long anal setæ. The mouth in the males is completely obsolete, and in the females the promuscis is very short of three joints arising apparently from the breast, emitting four very long setæ capable of being thrust into the bark or stems of trees. The antennæ, of the females, short, of from eight to eleven joints; of the males, elongated more or less.

Our insect is at once excluded from the DIMERA and included in the MONOMERA, by the character which is made the basis of classification, namely, the number of joints in the tarsi; but placing it there we at once find numerous characters that exclude it from the group, for in the males there are four well developed wings, which is surely a strong character, there is more than a single unguis to terminate the tarus, there are no anal setæ and the beak is prominent in both sexes. The number of joints in the antennæ would exclude it from both sections, although coming nearer to the DIMERA. Since we find that notwithstanding the primary character disagrees, all the other prominent characters, as well as the habits, etc., agree in placing it among the the DIMERA, we must necessarily overrule the one character, and having placed it in DIMERA, it at once falls into APHIDÆ, as evident characters immediately exclude it from both PSYLLIDÆ and ALEYRODIDÆ, the former having ten-jointed antennæ, and the latter wings of equal size, broad and farinose, antennæ six-jointed, promuscis and tarsi two-jointed.

Dr. Packard defines APHIDÆ* as having from five to seven joints in the antennæ, generally longer than the body, beak three-jointed, developed in both sexes, legs long and slender, tarsi two-jointed, and COCCIDÆ* as having six or more joints in the antennæ, tarsi two-jointed, the beak wanting, and the hind wings usually so in the males.

According to this division, the joints of the antennæ place our insect in APHIDÆ, the joints of the tarsi exclude it from both families, while the beak and wings place it in APHIDÆ and exclude it from COCCIDÆ. In giving two joints to the tarsi in COCCIDÆ, Dr. Packard goes in direct opposition to Westwood and other authorities who make the one-jointed tarsi a distinguishing character.

Allowing for a moment Westwood's classification upon the joints of the tarsi, it is very easy to be led astray, as our insect then falls into the genus *Coccus* (where it was placed by Fitch), the division *Pseudo-coccus* of Westwood, in which is placed the common Mealy Bug (*Coccus adonidum*) of green-houses, and since these possess some striking resemblances, the conclusion may be hastily reached that this is its place. It furthermore corresponds here to the sub-family COCCIDES of Signoret, in which some characters would seem to place it. But this insect, upon the whole, is by no means of such a degraded character as the members of this group, besides considering the important characters before mentioned which place it in APHIDÆ.

* Guide to the Study of Insects, pages 519 and 525.

Digitized by Google

Assuming now its place in APHIDÆ to be uncontested, notwithstanding the joints in the tarsi, let us proceed to unravel its generic relations which seem, in some respects, more confused even than those of the family. According to Westwood's "Generic Synopsis" (page 118), it is excluded at once from *Aphis* and *Lachnus* by having no abdominal tubercles; it differs from *Phylloxera*, with which it otherwise presents some remarkable affinities, by not having the wings carried flat on the back; it differs from *Adelges* in having the legs moderately long and slender, instead of very short; it would be excluded from *Byrsocrypta*, as limited by Westwood, on account of not inhabiting closed follicles of leaves or stems, the genus being separated from *Eriosoma* by this author, to contain those species possessing this habit. The genus was originally founded by Haliday, and corresponds to *Chermes* of Burmeister, consequently if allowed the same probable range as the latter may possibly include our species, since then we make both this and *Chermes* synonomous in part with *Eriosoma*, and *Eriosoma*, as limited by Westwood, receives our insect without modification, except as to the family characters before noted. *Eriosoma*, founded by Leach, is equivalent to *Lachnus* of Illiger, to *Myzoxyle* of Blot, and *Chermes* of Burmeister, for part separated as *Byrsocrypta*. "It differs," says Westwood, "from *Aphis* in the neuration of the wings as well as in want of tubercles on the abdomen. The antennæ also are shorter than in the true *Aphides*." It contains the *Eriosoma lanigera* or Apple blight, and the *Eriosoma pyri* or Apple Root-louse, to both of which our insect shows some marked affinities and also some strong dissimilarities.

Packard says that *Eriosoma* "differs in having no honey tubes and in having only two median (discoidal) cells; the species are covered with a wooly flocculent substance," etc.

Taking the name *Chermes*, the generic limits of which as concerns us we have already shown, let us see the range it has previously occupied. It was first used by Linnæus to indicate species afterward placed in *Psylla* by Geoffrey, characterized by having the head moderately notched in front, antennæ slender, wing covers membranous, belonging to the family PSYLLIDÆ as at present defined.

Westwood states of this change, that Geoffrey considered this name improperly applied by Linnæus and gave the name *Psylla*, while he employed *Chermes* in a more legitimate sense to designate some of the Linnæn species of *Coccus* which had been employed as dyes, the name Chermes, Kermes or Alkermes having been given by the Arabians and Persians to the *Coccus Illices*, Linn., or famed Tyrian dye. Thus, with *Chermes* of Linnæus we have nothing to do. *Chermes* of Geoffrey leads us to *Coccus* of Linnæus, but *Coccus* of Linnæus had a far wider range than *Coccus* as at present defined, and without doubt included much of the region now embraced in APHIDÆ as now understood. It has, therefore, much more connection with our subject, for it is undoubtedly from this source that *Chermes*, as at present limited, was derived. It is more than probable that were other and later authorities at hand, it would be found that these limitations are much more

Digitized by Google

definitely settled,* but unless they are clearer than the ones to which we have access, there is surely a great need of a careful revision of the groups here mentioned, in order to allow of the natural arrangement of many species, which, departing from the stated characters in some particulars, still possess so many which indicate their relationship as to make their separation unwarrantable.

For the present, allowing the limitation I have stated, and taking such authority as Prof. Riley, it may be best to call our genus *Chermes*, and there being no question as to the specific name, it is species *pinicorticis*.

PARASITES.

The undue increase of this insect seems provided against in the parasites which prey upon it, there being no less than half a dozen species which appear to be actively engaged in its destruction.

A little black mite (Plate II, Figs. 1 and 2) which may, with very little doubt, be considered as working upon the lice, was found last spring living among the downy balls. It is jet black, the shell hard and shiny, almost globular in form, the cephalo-thorax and abdome being fused together. The legs are clustered closely together, four on each side, and attached just back of the anterior border of the shell. This species probably belongs to the family ORIBATIDÆ and genus *Oribates*.

A larva of the Dipterous genus, *Syrphus*, was also found making its home among the lice, and as the members of this are characterized by preying upon different species of *Aphidæ*, there can be no doubt that this was its office. These *Syrphus* larvæ (Plate II, Fig. 5) are eyeless, but being hatched by the foresight of the parent fly in the midst of their food, they have no difficulty in gaining a livelihood and proving a serious enemy to the lice.

The specimen examined was 8 millimeters in length when extended; the head (or rather the anterior segment, there being scarcely a distinct head), is very small, provided with a sharp beak-like instrument, upon which it impales its prey to suck its juices; the succeeding segments are gradually enlarged, the posterior segment being the largest. There are no legs proper, but the six segments preceding the last are provided with something similar to prolegs, though they appear to be little used as propellers. In traveling the

* Since this paper was written, I have had the pleasure of examining the report of Prof. Thomas upon the *Aphidæ* and find a much more satisfactory classification of this family. It is divided into the sub-families *Aphidinæ*, *Pemphiginæ*, *Chermesinæ* and *Rhizobiinæ*. *Chermesinæ* is characterized by having the front wings with but two discoidal veins, the third being absent; antennæ never more than five-jointed, sometimes but three-jointed. It contains the two genera *Chermes* and *Phylloxera*, the former having five-jointed anteunæ, the latter three. The genus *Chermes*, to which this insect doubtless belongs, although Prof. Thomas does not describe it, disagrees slightly in the neuration of the wings and no mention is made of the aborted or wanting joint in the tarsus. The character, which Dr. Fitch gave as generic, *i. e.*, the female oviporous but not extruding her eggs, is also not applicable to this species.

Digitized by Google

larva pushes the head forward and fastening it to the surface either by its beak or by emitting a gummy fluid, draws the remainder of the body up to and over it so that the last segment is close to the first, then loosing the head it is pushed forward again and the same process repeated. The last segment also emits a gummy substance by which it seems to adhere, this leaving a trail on glass. The general color is a reddish-gray, and the body is thickly covered with the downy substance derived from its surroundings.

The chrysalis (Plate II, Fig. 6) is 5 millimeters in length, nearly 2 millimeters in transverse diameter, being formed from the skin of the larva, thus possessing the same color and markings, and being thickly covered with minute transverse ridges. It is fastened by a hardened gummy excretion to a leaf of the twig upon which it has lived, the posterior portion being slightly attenuated, thus reversing the shape of the larva.

These *Syrphus* larvæ are evidently, in turn, parasitized by the well known Ichneumons, as the only chrysalis which I succeeded in obtaining, produced instead of a fly a Hymenopterous adult belonging to the genus *Microgaster* (Plate II, Figs. 3 and 4).

DESCRIPTION.

General color black; antennæ eighteen jointed, filiform, set close together, half-way between the eyes and between the vertex and labrum, very finely pubescent. Legs: coxæ enlarged, anterior yellow, the others ferruginous; femora fusiform, anterior at base and apex yellow, at the middle ferruginous; middle and posterior ferruginous throughout; tibiæ, anterior and middle, light brown, the posterior with basal third black, middle third white, and apical third black running into brown, and then dark at apex; tarsi, five-jointed, anterior light brown, middle brown, posterior nearly black. Tibiæ, anterior terminated by a spine, middle and posterior by two spines; abdomen of seven or eight segments, anterior one elongated, black at base running into brown; the next two with transverse suture, brown; remaining segments black with transverse suture indistinct. Anterior wings with strong costal nerve and triangular stigma; three basal areas, three discoided areolets, four apical areolets, the posterior basal area extending just beyond the posterior discoidal areolet.

Still other very important enemies to our insect are found in the larvæ of a species of *Chrysopa* (Plate II, Fig. 7). These are exceedingly active, and it is surprising how rapidly they will seize and devour the young lice.

They are light yellowish with a sub-dorsal row of reddish-brown spots upon each side. The anttenæ are slender and three-jointed, tarsi one-jointed. Length, four millimeters, much longer, however, when full grown.

The adult of this species has not been secured, and therefore its par-

Digitized by Google

ticular name is unknown; it is however one of the Lace-wing Flies which are found abundantly during the summer.

Prof. Riley in his Fifth Annual Report, page 100, says: "The larvæ of certain small Lady-birds belonging to the genus *Scymnus* with their dense and even clothing of white cottony tufts, feed alike on the bark-lice (referring to the Pine Scale-louse) and upon a wooly *Aphid* (*Chermes pinicorticis*, Fitch), which oftimes covers the bark and is frequently found in conjunction with the leaf scale."

The same author in the same report, page 101, says further: "Still another insect of this family, namely, the Painted Lady-bird (*Coccinella picta* Randall), I have discovered preying on our Pine Leaf Scale as well as on the aforementioned *Chermes*." This gives us authority for two more enemies, which I have not discovered as yet working upon the species here. Last May I placed upon one of the evergreens infested with this louse some apple twigs which had been badly infested with the Oyster-shell Bark-louse (*Mytilaspis pomicorticis*), and were well stocked with the mite known as *Acarus malus*. The following October, in making some further examination of twigs covered with woolly lice, from this same tree, I noticed many of these little mites running here and there among the downy patches. This led me to examine further to see if a similar mite was working upon other trees, but as yet none have been found. So there seems to be a strong probability, at least, that the mite of the Oyster-shell Louse, exhausting its natural prey has taken readily to preying upon the somewhat similar lice which it found upon the evergreen. If such prove to be the case the mite may be very profitably put to work in the destruction of this woolly louse by simply transferring twigs which contain them to trees that are not yet stocked. As to the probability of this being a species common to this louse and distinct from the one preying on the Oyster-shell species, we can only say that although there is such a possibility, still it seems far more probable that it is the same species, as were it otherwise we would naturally look for it to occur on all the trees infested, and also look for specific distinctions which do not (so far as present examination goes) appear.*

We have further noticed a species of Thrips which is quite common on the infested branches, and as we have the authority of Prof. Riley that these lively little insects prey upon the *Phylloxera*, which

* Later examination seems to make it quite doubtful whether the mites worked on the lice for any great length of time, and knowing how averse parasites seem to be to living upon other than their natural hosts we can hardly expect to force them to any extended work upon whatever species we wish.

Digitized by Google

is so similar to this louse, we may quite safely infer that its presence indicates it to be engaged in the destruction of the lice.

REMEDIES.

Should this insect increase beyond the control of its natural checks there is probably no better application to recommend than that given by Dr. Fitch: To wash the affected parts with soap-suds. This however will be much more difficult on the small twigs than on the trunk and large branches where he observed them. Mr. H. W. Lathrop, of Iowa City, dusted his infested trees with ashes, and believes the lice were thus removed. This remedy is so simple and easily tried that it is well worth notice.

As the lice seem much more plentiful on trees in close groups than upon isolated ones, they could doubtless be influenced by more open setting. This would also prevent their spreading with as great rapidity, for they do not seem to travel readily from one tree to another where the branches do not interlock.

There are many points in connection with this pine-louse still to be determined, but this will require much further investigation. This paper simply representing the main points at present known.

DISCUSSION ON REPORT.

Mr. Foster: The English sparrow has appeared in Muscatine. It is reported that in the vicinity of Philadelphia this bird has taken care of the new and the old cabbage worms.

Mr. Osborn: The new Cabbage Butterfly has been taken on the College Farm the past season. I have as yet had no experience in fighting them. I have some faith in the hot water remedy we have noted in the papers.

Mr. Lathrop: At Iowa City the new comer did much damage to the late cabbage.

Prof. Bessey: I would like to enquire of members about the present distribution of the Woolly Aphis, infesting the pine. It appeared at the College two years ago. It has done its work mainly on the Scotch pine. It has damaged the Austrian pine but little, mainly I suspect on account of its gummy twigs. I showered some trees in my yard with kerosene and water and it seemed to about eradicate them.

Mr. Foster: This nuisance appeared in Muscatine fifteen years ago.

Mr. Lathrop: We have it at Iowa City.

Digitized by Google

Mr. Haviland: They are very numerous at Fort Dodge; literally the past season piled up on the new growth. I have noticed none on the Austrian pine. A strong alkaline wash has been beneficial.

Mr. Bacon, Harrison county: We have had an insect in our section literally destroying the fruit germs in the first stages of development. We attribute our loss of fruit largely to this new-comer. They even destroy the incipient fruit of the Miner plum.

Mr. Dixon: I have been after this fellow for some time, but find him difficult to manage. The eggs are deposited at the base of the buds and are usually hatched before the blossom buds expand. The worms often cut into the bud before it expands and can be found among the filaments of the blossom. The worms are very small and cannot be seen at first without the aid of a glass. They live about three weeks, and are ceaseless in their mischievous work. They do their early work on the blossoms mostly in the evening. I have tried several plans to destroy this Tortrix. It is a difficult thing to do, as at first the worm is enveloped in the folded bud and the poison does not reach him. The best plan seems to be to destroy it in the chrysalis state, when they are on the ground in June. Plowing the ground in June seems beneficial. An enemy has happily appeared to aid us in our work. A copper colored fly, about the size of a chinch-bug, sucks the juices of the minute worms.

Mr. Bacon: We have noticed this pretty little bug and we have supposed him to be the chap doing the mischief. I am glad to hear that he is our friend and of the real nature of the insect doing the work. This perfectly illustrates our need of a competent State Entomologist, who can give his whole time to investigations of this kind for the benefit of agriculture and horticulture.

Mr. Dixon: I am hoping that the parasite is doing good work. Mr. Adams, of Allamakee county, has been quite discouraged with the work of this Tortrix, but the past season he reports a fair crop of fruit. Prof. Riley has given this insect some attention and refers to it in the last department of Agricultural Report.

Mr. Osborn: I would be glad to secure notes as to the present distribution in the State of the new Cabbage Butterfly.

Mr. Wilson: We had specimens of it the past season at Atlantic.

Mr. Bacon: It has been taken at Council Bluffs.

Report of Directors of Ninth District was now in order.

Digitized by Google

REPORT OF NINTH DISTRICT.

BY A. J. HAVILAND, FORT DODGE.

Mr. President and members of the State Horticultural Society—The ninth horticultural district includes the counties of Butler, Franklin, Hardin, Wright, Hamilton, Humboldt, Webster, Calhoun, and Pocahontas. Neither of these counties is noted, as yet, for producing any great amount of fruit; but what is produced compares favorably with that raised in a more southern latitude. The past season has shown but a partial crop of fruit, from medium to fair in quality; the shortage being attributable to a warm early spring, and late frosts coming after the fruit had formed. Vegetation of all kinds had pushed forward at least two weeks in advance of the season, and on the 3d and 4th of April the thermometer indicated 19 degrees, taking most of the small fruits.

Our next heavy frost came the first week in May, reducing our apple and cherry crop fully one-half, and sweeping almost the entire crop of plums. Our extreme climatic changes render it necessary to mulch our early starting varieties and keep them back.

Planting trees of all kinds commenced in good earnest last spring, with a seeming determination to make up for lost time; large orchards being set with satisfactory results.

Our winter apples ripened very early, and commenced decaying as soon as gathered.

In our orchards that have been set twenty years, the varieties that are looking best are Fameuse, Red Astrachan, Duchess of Oldenburg, Talman's Sweet, and Willow Twig. In our recent plantings we find the Ben Davis, Pewaukee, Walbridge, Gros Pomier, Wealthy, and Duchess of Oldenburg are the best orchard trees.

In starting our first orchard in Webster county we planted our trees fifteen feet apart, expecting when a demand for room came to cut alternate rows, leaving them thirty feet apart. Our practice in pruning was to cut out the top, and encourage branching very low to the ground. The original design of thinning out has not been followed

Digitized by Google

by the parties who own the orchard, and the result is the limbs are dying out, and the lower branches produce but little fruit, and that of inferior quality. Our experience has been that twenty-five or thirty feet apart is close enough to set apple, and fifteen for cherry trees; pruning up to four feet to give a chance for cultivation. Our first orchard taught us the lesson that a low-headed tree, branching low to the ground, comes very near being a nuisance.

We find in pruning that the wounds heal best when the trees are growing freely—about the 1st of June.

The blight has done us more injury the past season than ever before commencing in May, when trees had made a growth of two inches, and finishing up its work before the 1st of July, damaging all varieties in the nursery more or less severely. I lost a very fine Flemish Beauty pear tree, top-worked on the White Thorn, the blight killing the entire top by the 1st of June.

Our fruit trees are well set with fruit buds, and are apparently uninjured.

Grape vines, blackberry, and raspberry bushes are looking well. The Snyder sustains its reputation with us for being hardy, and has fruited the past two years, giving satisfaction. The Turner is the best and hardiest red raspberry we have, and is worthy of a place in all collections. Mammoth Cluster and Doolittle are our best black-caps.

Evergreens made a good growth, except the Balsam Fir. Every tree of this variety within my knowledge has died where standing alone. Grouped with other varieties it appears uninjured.

There has been Catalpa enough planted the past season to prove or disprove its adaptability to our district, J. R. Straw and J. B. Scott each having several acres of the Speciosa variety planted in drills. The seed germinated well, and the trees have made a good growth—from fifteen to thirty inches high, good, stocky trees. I examined one block of the trees to-day (January 15), and find them killed back from four to eight inches.

DISCUSSION ON REPORT.

Mr. Foster: Some of the young shoots may be injured at their terminal points on the hardy Catalpa, but I cannot believe that serious injury will be done them in any part of the State.

Mr. Van Houten: So far as I know they do well as far north as Council Bluffs. We there hear of their killing back more or less on the high bluff soils.

Digitized by Google

Mr. Haviland: We have some old trees at Fort Dodge which as yet seem all right, and they are very beautiful.

Mr. Wright: I do not think they will prove hardy as far north as Sioux City.

Prof. Bessey: Slight killing back of the terminal shoots is no argument against the introduction of this tree. Some of our native forest trees will do this to greater or less extent during our most severe winters.

Mr. Ireland: I do not wish to unduly laud, or at present to condemn, this much talked of tree It may prove a good thing at the north, but we had better go a little slow. Extended plantations at this time may discourage tree planting. Every present timber plantation on the great northern prairie should be a success. I freely admit that slight killing back when young is no argument against it. The Black Walnut often kills back some when young, but it is all right as it attains age.

A paper on the desirability of an Arboretum in the State was now announced and read.

THE ABORETUM.

BY PROF. W. D. F. LUMMIS, PATON, IOWA.

Mr. President—This is a subject hitherto unagitated in the prairie States, and but few have taken any interest in it in the Eastern States. It belongs to older, more wealthy, and more cultivated countries. In a country so new, where all the wealth in existence must have come from the good acres so lately covered with forests, and from the wild expanse of the illimitable prairies; where primogeniture does not prevail as in the old countries of the Eastern world, affording leisure both for culture and research, science and poetry, we do not expect to see money offered, as in the old world to build marble fountains, rear Milan Cathedrals, and St. Paul churches, or to make the grand Arboretums of Germany, France and England. Our young men have not means to conserve

Digitized by Google

such interests, and when they become older and more wealthy, money making, and what is worse money preserving, absorbs those thoughts of poetry, beauty, and æsthetical culture, that once took hold of more enthusiastic natures.

But as this subject is to come here in the West in the future, as already it has taken shape in some instances in the Eastern states, it occurs to me that it would be wisdom, dictated by economy, *now*, while land is so cheap, for our Legislature to immediately take steps looking to the establishment of an Arboretum at the capital, or in some other suitable locality in our State. Sixty acres of land, now costing $1,500, and a small sum per annum for the next six years to raise the stock in nursery, for after setting in Arboretum, would save in twenty years on the mere cost of the land perhaps $6,000. By growing the stock instead of purchasing a great saving can also be made.

So many things will suggest themselves to us of advantage to the State, and to arboriculture among us, by the State's establishing an Arboretum, that I think this society will not need much urging to petition the Legislature to undertake this inexpensive yet excellent enterprise from which we may reasonably expect great public advantage.

I have a plan by which all the stock for planting the Arboretum could be furnished at almost no cost to the State from rent of the land till set, provided the tract of land purchased contained 160 acres. (A lesson in connection might be given in presenting the results of the purchase of cheap lands by English universities two hundred or five hundred years ago.) No other State has done this it is true, but no other State perhaps has done another thing that we have already done in running our internal machinery so economically that to-day we are out of debt, and Iowa would without sinfulness too do several things that no other State has thought of.

I give below what information is at hand in respect to the arboretum:

The first one of our country was called a Botanical garden; and was begun by John Bartram, a cultivated Englishman of Philadelphia, who was a friend and patron of the poor, but devoted ornithologist, Alex. Wilson, who is buried in the grounds of the old Swedish Church in Philadelphia. This arboretum was begun in the early part of the seventeenth century. It was continued by his son, Wm. Bartram, who died in the early part of this century. Since the death of the latter, the work has been continued by his son-in-law, C. R. Carr, and his

Digitized by Google

wife—Ann Bartram—who inherited from her father a love for botany.

About 1850 Mr. and Mrs. Carr sold the estate to A. M. Eastwick, who, though proud of the existing trees, has added nothing to the collection, and many have disappeared by accident, and old age. I have not seen it since 1855, when it contained about twenty acres.

The arboretum of the Hamiltons at the Woodlands, near Philadelphia, contained over seventy acres perhaps, and was all one large pleasure ground in the early part of this century, but is now the "Woodlands Cemetery." Some fine and rare trees are still there.

The Laurel Hill Cemetery of that city was also once a fine arboretum, but lot holders have the right to remove trees, and many, through ignorance and thoughtlessness, have been cut away. This was started by the author of Michaux—John Jay Smith—who was a rare lover of trees.

The best private collection of trees belongs to H. H. Furness, the Shakespearian author. He may have 700 or 800 kinds of trees and shrubs at his country seat.

Fairmount Park also has 700 or 800 kinds of trees in its grounds, and constitutes one of the most beautiful resorts of this country, but the trees are not catalogued or arranged, and people hardly know what is in it.

The best collections of trees and shrubs are now in the hands of nurserymen and yet in nursery. One of our enterprising nurserymen has about 1,000 kinds of ligneous plants, and Thomas Meecham received the highest Centennial award on a collection of 750 ligneous plants.

Heverford College, also near the Quaker city, has a fine collection of trees and shrubs, about 200 in all, which were planted about forty-four years ago. The College has no catalogue. The President says: "They have served a good purpose to instill into the minds and hearts of the students the love of trees and for arboriculture, and it is designed to increase the collection soon." The beauty of this little arboretum is known far and wide.

The arboretum of Harvard College is at Brookline, Mass., near Boston. There are 125 acres in it, and sixty acres are now covered with a native growth of trees and vines more or less dense. They have about 1,000 species and varieties of trees and shrubs now growing in nursery. They propose to plant them out in winding drives, about two and a-half miles in length. It is proposed to set the six speci-

Digitized by Google

mens of each species and two specimens of each variety in a clump of eight trees, to represent each species, with a view eventually to thin out the six to two full grown trees. They will set the shrubs in a plat or shrub garden of five acres.

They will all be arranged in their botanical sequence and labeled with metallic labels. This is by far the best beginning for an arboretum in the United States.

I might mention that an arboretum has been founded on a bequest of the late James Arnold, of New Bedford, Mass.

The Agricultural Department at Washington has in process of formation an arboretum, but nothing has been done to it for several years, and it is yet very incomplete.

In 1861, Rev. J. H. Creighton began tree planting on the grounds of the Ohio Wesleyan University, where are now growing 800 kinds of trees and shrubs. The grounds are too limited for further extensions.

DISCUSSION ON REPORT.

Mr. Foster: While I believe that the establishment of an arboretum in the State would be a good thing for our credit, and a thing of real utility, I yet can see no motive for the purchase of land by the State for this specific use. The State now owns in fee simple thousands of acres suitable for such use. The Agricultural College grounds would be eminently a suitable point for such a plantation, and the ones in charge could capably manage the work. Indeed, if I mistake not, some start has there been made in this direction. The native and artificial groves and lawns probably have over 200 specimens and varieties.

On motion the society adjourned to meet at half past seven in the evening.

Digitized by Google

TUESDAY EVENING SESSION.

Society convened at half past seven.

Mr. Foster stated that since leaving home he had learned of the death of Robert Avery, of Des Moines county, one of the pioneers of Iowa Horticulture.

He moved that a committee be appointed to draft suitable resolutions.

Mr. Foster, Dixon, and Strohm were appointed such committee.

Mr. Fitch B. Stacy, Secretary of the Iowa Live Stock Association, now announced that it was desirable to arrange for the holding of Farmers' Institutes in the several counties of the State under the combined management of committees from the State Agricultural College, the Live Stock Association, and the State Horticultural Society. The purpose was to secure the appointment of a lecturing committee, appointed by these separate organizations. The Horticultural Society can do a valuable missionary work by co-operating in this movement. The first meeting of this series will be held at Osage, in Mitchell county. It is desired that a delegate be appointed to attend this meeting from your Society.

Mr. Foster moved that Mr. Patten, of Floyd county, be appointed such delegate.

Mr. Speer: It seems that we should also provide for future Institutes. The work is surely one in which this Society may do some valuable work, and we should encourage it in every reasonable way.

Mr. Stacy: The plan is to have members of this committee appointed in different parts of the State.

Mr. Lathrop: I understand the plan to be for the people in the different localities to make arrangements for the meeting, and to invite the delegates from the different societies to meet with them.

On motion, it was now ordered, by unanimous vote, that a committee of six be appointed by the President; two of which committee to be selected from each of the three main fruit districts of the State.

This committee will be found on the preliminary pages of this report.

The annual address of the President was now in order

Digitized by Google

PRESIDENT'S ADDRESS.

Gentlemen of the State Horticultural Society — Under other circumstances it might seem proper for the President in his annual address to present to the Society a summary of the work for the year past and a forecast of that for the year to come. But a glance at our programme shows the fullest attention by others to all details of our last year's work. We have reports from skilled observers in every region of the State, and able essays upon all important branches of our science. It is with pardonable pride that we look from the present vigorous estate of our Society to its condition ten short years ago. Then our report was a very thin volume of only one hundred and fifteen pages; and the changes for the better in both matter and manner of the contents is not less striking than the increase in quantity. The whole work shows the influence of constant study by our working members. Every year certain steps are made and recorded. These again open new views, and year by year the march is onward.

This brief paper will be devoted to a survey of some new paths of usefulness to the State which seem to lie open before us.

SHOULD HAVE A HOME.

This Society, chartered and pensioned by the State, and charged with labors of the highest importance to the material development of the State, should clearly—unless it prove itself unworthy—have a home allowed it in the House of the State.

The magnificent collection of fruit casts and woods which so worthily represented the fruits and forests of this State at the "Centennial" are now liable to damage and decay, without a resting place. They deserve well of the people of this State, and should at least have one room allowed them out of the multitude to be in the great marble pile upon yonder hill top.

Our sister Society of Agriculture has taken steps to secure such a room as a home for itself. We hope they may secure it. But, if they, pointing to their past labors demand and receive so much, why may not we too point to our striking exhibit at the Centennial, which contributed more than any other to remove from our State the reproach of being a fruitless and wind scourged land of grass, to our many broad medals won in fair fight by the excellence of our fruits dis-

Digitized by Google

played in competition at the great fairs of the American Pomological Society, at Richmond, at Boston, at Chicago, and lately at Rochester: may we not further point with just pride to our annual report, rich in the lore of the orchard, the garden and the forest, invaluable to every citizen of this prairie State; and, having shown these, our labors and our triumphs, may we not in all modesty say, "We, too, have deserved well of the State"?

I would recommend the appointment of a suitable committee to make known our wants to the proper authorities, and have no doubt that our request will be cheerfully granted.

SOCIETY SEAL.

This Society should have an official seal to properly authenticate its official papers. Within the past few days the need has been apparent. On applying to the agent of a certain railroad for reduced rates to our members attending this meeting, he replied: "Yes, I think arrangements could be made, upon properly attested certificates of attendance stamped with the seal of the Society." A suitable seal with press would cost but a few dollars. I would recommend that the executive committee be authorized to procure one.

LIFE MEMBERSHIP.

It has been said that this Society lacks permanence in its membership, which—saving a half-dozen honorary life members—ceases utterly the day before each annual meeting, and that when we talk of the rights of our members in the property of the Society we are not certain, after the end of the year, of having any members. There is some appearance of force in all this. At all events it has been and is the custom of similar societies to have at least a strong nucleus of life members. Such a membership forms a stable working force, able to carry on through a term of years any desirable line of work. A fee of ten dollars, properly invested, would equal our annual dues and be less troublesome.

I recommend this subject to the careful attention of the Society.

DESCRIPTIVE CATALOGUE.

As our report is now published we present lists of fruits, flowers and trees, most reliable in different localities of the State.

But only a few of the multitude in cultivation appear there. Some

Digitized by Google

other societies gather at the end of their annual report a full descriptive catalogue of all fruits, trees and plants cultivated within the State.

The use of abbreviations is so ingenious that in case of fruits, for instance, all the important characteristics of size, form, color, quality, season, origin, use and value for dessert, cooking and market, on a scale from one to ten, with locality where most successful, relative hardiness of tree or plant, and explanatory remarks appear in parallel columns, in such limited space that thirty-six varieties occupy but two pages of the volume. Trees, shrubs and flowers are similarly characterized by their most obvious features. Such a list would be a work of time and subject to annual revision and addition, but would add immensely to the usefulness of our report. I would recommend a committee, not less than seven in number, suitably located, who would make their lists during the year which, after comparison and revision here, would pass to the Secretary for publication. If this work should involve a small outlay of money, I think it would be a wise use of the funds intrusted to our care.

SUMMER EXHIBITION.

To accomplish the foregoing desirable work, as well as to decide upon the claims to public favor of all our abundant and hardy early fruits which can never appear at our January meeting, we need, and it seems to me must have, at least one early exhibition either in summer or in early autumn.

Section 3 of the State law regulating this society provides that at the annual meeting "the place of holding the next annual meeting, and the times and places of holding exhibitions shall be determined," etc., showing clearly the intent of the law that more than one yearly exhibition should be held. I commend it to the attention of the Society whether the time has not now arrived for arranging at least one early meeting.

DISTRIBUTION OF NEW OR RARE FRUITS, TREES OR PLANTS.

One further subject I wish to present to your attention and I have done. It is the distribution and testing of new or rare fruits, trees or plants.

It is said, to our reproach, that while many of the noblest evergreens of our Rocky mountains are not uncommon in foreign nurseries and

Digitized by Google

pleasure grounds, and some have succeeded on the frozen plains of Russia, upon our wind-swept prairies they have never been fairly tested.

But, with trees as with men, it often befalls that the worthiest are not without honor save in their own country. We have the best of reasons to expect success with several of these trees, and just now are able to test them at little expense. Robert Douglas & Sons, of Waukegan, Ill., have propagated them in quantity, and have offered us two-year plants for trial at nominal prices. Knowledge as to the capabilities of these trees is eagerly sought by our citizens, and it would seem entirely within the scope of our duty in obtaining information for the people to make this test. We can expend a small sum in distributing a score of packages of these young trees to competent observers, suitably located, who would only be required in return to properly plant, cultivate and protect each variety, and to report annually to the chairman of our Committee on Distribution their comparative success or failure. In a short time we should be able to report authoritatively on their value to the people of the State. If we may import and test Russian fruits, why not with equal propriety test the promising evergreens from our own mountains?

For this and for other like purposes I would recommend the selection of a standing committee, not less than five in number, whose duty it shall be to designate the experimenters, and transmit to them the trees or fruits to be tested, and to watch over and report annually to this Society the condition or result of every experiment undertaken.

To this committee would also fall the distribution of scions of the Russian apple and other fruits, for whose importation this Society has appropriated funds.

I am informed by our Secretary that of this importation more than four hundred varieties are now growing on the College farm, consisting of apples, pears, plums, cherries, etc., and that scions of very many of the apples are now ready for distribution and trial, while many other varieties will be available next year.

The slight charges of packing and transmitting these scions to the experimenters should, it seems to me, be borne by the Society; but in turn its recipient should sign an agreement to conduct the experiment according to the directions of the committee, and to return a correct annual report of the progress of the test. In some such way alone can we know promptly and certainly the comparative value of this host of strangers. Just now our citizens appear in danger of severe

Digitized by Google

daisppointment from these supposed Russian friends. They seem willing to close their eyes and buy and plant anything called Russian, without knowledge of its worth or worthlessness. This Society cannot afford to allow the public to believe it recommends indiscriminate planting of Russian apples, simply because they are Russians.

We might as well, without knowledge, advise filling orchards with a job lot procured from some other cold climate. We must test and sift these strangers, holding fast only the good. They have undoubted value, and I agree entirely with the words of our Secretary, read before this Society five years ago: "If," said he, "out of five hundred varieties we import, only ten, or even five, which prove exactly adapted to our wants, we shall have accomplished a work worth, in dollars and cents to our State, an amount difficult to estimate."

The public must have patience and understand that if they will plant unadvisedly before trial they must be prepared to bear as patiently as they may the disappointment that may follow. To expect a thousand varieties from a land distant one-third the circumference of our globe to all succeed in competition with our list of well-tested varieties would be folly.

But of the final good results from this immense infusion of new and vigorous blood into the body of our fruits, I have no possible doubt. Mr. Darwin has lately published an interesting volume of experiments, showing the benefit of cross fertilization in plants. These stranger fruits, coming to us across some 9,000 miles of land and sea, are all from a region subject to the severities of an inter-continental climate like in many respects to our own.

Regions remote from the perennial moisture of the sea are always subject to droughts and scourged by drying winds. Trees and men from moisture regions find these taxing to their vitality, but races of men and of trees are developed by the natural selection of ages especially fitted to flourish under these conditions. Hence our expectation that the newly imported fruits from Central Russia—many of them having previously traveled from the lofty table lands of Central Asia —will afford the first requisite to the solution of our problem of procere pomology, to-wit: A tree so adapted to our conditions as to luxuriate in life, having, besides the vitality necessary to success in the struggle for existence, a surplus available for maturing fruit and for storing the tissues of its new wood with the rich starches needed for another season's growth.

Having widely disseminated among our most careful experimenters

Digitized by Google

this host of vigorous strangers, affording such boundless scope for amelioration by culture and by crossing with our finest-flavored and longest keeping varieties, which fail now because lacking in constitutional vigor, we shall deserve ill of posterity if we fail of results of incalculable value to the dwellers on the grassy plains between the great river and the great mountains. We shall, at least, deserve reprobation if we fail without having exhausted every effort possible to willing brains and patient hands.

We have to aid in our labors a strong organization here, affording ample means of exchanging advice and counsel, and publishing results, and below all the rich soil of a great State as a basis for experimentation.

If we do not at once reap all the fruits of our labors, we shall only follow the inexorable law that binds all things earthly. Great labors are only wrought painfully and slowly—slowly. But judging by all the experience of the past, we are on the right road, and if we keep our faces forward we must advance.

The address was, on motion, referred to a committee consisting of Messrs. Lathrop, Foster and Patten, with instructions to make a digest of the recommendations embodied in the address and present them to the society.

SECRETARY'S ANNUAL REPORT.

To the President and Members of the Iowa State Horticultural Society—I am again pleased to report the continued advance of our Society in all the divisions of the grand work contemplated in the act under which it was endowed.

Our annual volume exhibits a growing zeal and ability on the part of our directors, standing committees, and members, attracting the general attention of propagators, tree-planters, and fruit-growers, in this country and in Europe.

Digitized by Google

This brief report will merely outline the leading items of duty connected with this office, to which will be added two or three suggestions as to the future work of the Society, which have been forced on my attention during the year.

FORESTRY APPROPRIATION.

In accordance with the resolution passed at our last meeting, the Forestry Annual was carefully re-written, and enlarged to thirty-two pages. With a view to including in this report the most recent notes of experience as to the relative value of varieties and species of our timber trees for prairie grove-making, an extensive correspondence was opened with many parties in our State, and in those adjoining on the west, north, and east.

The wide distribution of this pamphlet has been followed by very many complimentary notices in the journals of the United States, the Canadas, and Europe; plainly indicating a growing and widespread interest in arboriculture. I have also received a very great number of letters, congratulating this Society for the wisdom evinced in the adoption of this method of advancing this vitally important interest. The edition printed will prove ample for distribution in 1880.

ANNUAL REPORT.

Our volume for 1878 was distributed at an earlier date than has been usual, and is creditable to the Society and the State, both in its subject matter and its mechanical execution. We have reason to hope that our volume for 1879 will not be behind its immediate predecessors, in value of contents, or general make-up. The reports of our directors, and of the individual members of our standing committees, will be prepared with more care than has been usual. Some of them will not be ready for presentation at this meeting, but will be ready in time for printing.

EXPERIMENTAL STATION.

The scions of the apple and pear imported from Russia under the auspices of this Society, have been successfully started on the grounds of the College Farm, and about $90 of the appropriation of the Society for this purpose has been expended, as shown by vouchers in the hands of the Treasurer. This expenditure included eight dollars paid for custom-house duties in New York, which amount, through the intercession of Senator Kirkwood, has been refunded and placed in the

Digitized by Google

hands of the Treasurer. The importation of scions collected and selected with great care, by Dr. Arnold, Director of the Agricultural Academy at Petrovsk, near Moscow, was delayed in transit, and for a long time was supposed to be lost. It finally came in fair order about the first of last May. Had the weather been favorable ninety per cent of the scions would still have been saved.

The cherry and plum scions in this valuable collection were entirely lost; a large per cent of the pear scions of some varieties were saved; and in other cases the varieties were totally lost. Perhaps not more than ten per cent of the apple scions grew, yet, fortunately, not more than twenty, of the two hundred varieties of the apple, were entirely lost. In cases where only one or two scions were saved, it will evidently take some time to get the variety propagated for general distribution. Fortunately, about forty varieties of winter apples in this lot, top-grafted on Gros Pomier in the experimental orchard, have grown with almost perfect uniformity; attributable to selection of scions in most perfect condition, the favorable condition of the stocks, and three or four days of favorable weather just at this time. It is worthy of note also that some of the Russian pears, top-worked on Gros Pomier, seemed to unite perfectly, and have made a better growth than most of the varieties of the apple. The quite large importation of scions from St. Petersburg came in fine order early in the winter, and they were root-grafted with uniform success, and the plants have made a fair growth in the nursery. This collection includes many varieties of fall and winter apples from the Russian interior not included in the Department of Agriculture importation of 1870. Nearly all of the Russian varieties, now in nursery, have but one year's growth, and the excessive drought of the past summer has not permitted the usual nursery growth of either home or foreign varieties. No trees will be disseminated until the trees have attained another season's growth. As it is desirable to have a wide and early distribution of these Russian varieties the members of this Society may secure scions of trees, and of the new iron-clads from other portions of the cold north, for top-grafting or root-grafting the current winter in accordance with the arrangements which may be made by a committee appointed by the Society. This early distribution of scions will be secured by cutting to the ground the one year old plants; a process which our experienced propagators know will but little affect the relative size of the trees when two years old. As yet no scions can be distributed outside of the membership of this organization.

Digitized by Google

We have in nursery about twenty thousand two-year old trees of new varieties, giving promise of great value from the most trying portions of the "cold north," and including such locally well tried varieties as are not yet common in our nurseries. These will be distributed next spring at a price in part paying for cost of production to members of the society, or to any one who gives the assurance that a careful orchard record will be kept and reports of their relative behavior be made to this society. No attempt will be made to establish a commercial nursery on the College grounds. The nursery operations will hereafter be confined to the growing of novelties giving promise of special value to the State.

No scions or plants of the Russian and Chinese pears can be sent out until a small stock be accumulated. It must not be forgotten that our most promising importations of scions were received less than one year ago.

APPROPRIATIONS OF 1879.

At the last annual meeting an additional appropriation was made of one hundred dollars for the further importation of seeds, scions, and plants, from Northern China, Central Sweden, etc. No part of this appropriation has yet been used.

In all cases we have found it slow work to secure by correspondence, such products from the sections of Northern Europe and Asia as we need for trial. The collections of scions we have received from interior Russia was not received until two years after our correspondence commenced. We are yet perfecting arrangements for importations in the winter of 1880–1. My quite extended correspondence with reliable scientists and fruit growers of the interior northern portions of the Eastern Continent, more than confirms the belief held by many members of this society, for several years, relative to the prospective prairie value of the fruits of this oldest peopled portion of the world. We can now say that we are sure of getting many varieties of the pear, apple, cherry, and plum, from this source that will mark a new era in prairie fruit growing. We also expect desirable new conifers, and ornamental shrubs and trees; hardy forms of small fruits, especially of the raspberry and barberry, and many other valuable products of the garden and field.

Prof. Sargent, of Massachusetts has also for several years past been gathering the plants of these remote regions, and obtaining by correspondence all possible information relative to the climate and pro-

Digitized by Google

ducts of the steppe sections of Northern Europe, and of the equally peculiar portions of Northern China. He encourages our efforts by writing as follows: "I quite agree with you in the very great importance of our securing as many of the northeastern Asia plants as can be obtained, but it seems difficult to get them. There are still many fine trees and shrubs of Northern China to introduce into our gardens, and it would almost pay some enterprising American horticulturist or company to send a collector to pass a year in the mountain region west of Peking. The introductions which could be made from there would, I think, be of immense value to the prairie states. But in the meantime I am doing what I can through various correspondents to secure such plants as have already been introduced into the Russian gardens. I shall take the greatest pleasure in assisting you in every way in my power in your work of adapting plants to the prairies."

This note clearly points out the relation often noted between the fruits, shrubs, and trees, of northwestern China, and the Russian gardens. The relative hardiness of the shrubs and plants of northern China is well illustrated by our Dyeletra Spectabalis, Peonies, Abies Siberica, Dyervilla Japonica, Snowball, Tree Honeysuckle, Forsythia, Wistaria, Spireas, etc., from this region. The Chinese Sand Pear, which with its seedlings, are now becoming notorious for their hardiness and exception from blight, also well illustrates the behavior of the thick leaved plants of this region noted for its hot, dry summers and cold winters. As the pear is indigenous in the groves of Siberia, we may reasonably expect to get improved varieties from Manchuria, and the mountains west of Peking, which will stand any phase of our climate. We also expect to get varieties of cherry, plum, apricot, and possibly peach, from this section which will prove decided acquisitions. But the difficulties connected with the lack of experienced growers and packers of such products in these regions, will prevent speedy results in securing these things for trial.

Our Society can legitimately aid the experimental division of the Agricultural College in work of this kind, more especially as the interest fund of the College will not permit adequate appropriations for extension in this valuable but expensive line of work.

The act under which we are endowed makes it our mission, in section 2: "In every proper way to further the fruit-growing and tree-growing interests of the State." The London Horticultural Society furnished a model in the way of what may be done in the dissemination, from year to year, among its members, of all novelties of fruits,

Digitized by Google

shrubs, trees, and flowers, of home origin, or as imported from other countries. Its experimental garden has done more for the advancement of horticulture in Europe than any twenty organizations only meeting for comparison of views mainly as to modes and methods. Our funds, indeed, will not permit the sending out of collecting agents to all parts of the world as the London society has done for many years, but in these days we can reach most regions likely to give us products that will prove valuable, at comparatively small expense, through consulates, scientific collectors, local nurserymen, local American residents, etc. With the start we have in the apples of Northern Europe and Asia we now should give special attention to the importation of their pears, cherries, plums, apricots, persimmons, edible thorns, peaches, grapes, raspberries, barberry, etc.

NEW CONIFERS.

An appropriation of one hundred dollars was also made at our last session to aid in the growing and dissemination of the most desirable Rocky mountain and other little known but promising conifers. As yet no part of this appropriation has been used. At once after our adjournment letters were written to residents of the forts in Montana, Arizona, and Dakota Territories, relative to procuring seeds of certain conifers, of which we have a few fine specimens in the State. I also corresponded with, and read the published notes of, scientists who have given much attention to the identification of these species in their native haunts. I soon came to the conclusion that no reliable collection of seeds or plants could be made unless under the personal guidance of a botanical expert actually familiar with their variations on different soils, and at different altitudes from the valleys to the mountain peaks.

I soon learned, also, that Robert Douglas, of Waukegan, Illinois, who has given these conifers long and careful study, had secured a large collection of seeds of the most desirable species, collected under circumstances warranting accuracy, with a view to dissemination in the west of the plants as soon as they could be grown. I also was assured that he had been successful in securing a quantity of seed of the most promising Oriental evergreens. His eminently favorable position, and his long experience, will enable him to furnish these plants at reasonable rates.

It will be entirely in accordance with the purposes for which we are organized if this appropriation be used for the distribution among our

Digitized by Google

members, for trial, of small packages of these plants so soon as they attain suitable size.

ENTOMOLOGICAL CUTS.

The appropriation of fifteen dollars for the purpose of purchasing cuts for illustration of reports in our annual volume was paid to Prof. Riley for cuts needed, three of which will be used in illustrating a paper on the new cabbage worm in the forthcoming report.

LIFE MEMBERSHIP FUND.

I will respectfully submit that the time has come in the history of our organization when a system of life membership should be inaugurated for the purpose of creating a perpetual interest-bearing fund, and forming the nucleus of a well defined, permanent organization. Its mode of working is well shown in the present condition of several of our sister organizations. In Michigan, for instance, they number at present about 150 life members. This, at the established initial fee of ten dollars per member, gives an interest-bearing fund of $1,500, which gives an annual income of $150, as invested in real estate securities. Of course the same number of members, paying an annual fee of one dollar, would give the same income, but the advantages accruing from this permanent membership cannot well be overestimated. The life members are quite certain to include the really earnest propagators, fruit growers, and amateurs of the State at large, and they soon develop an interest in the welfare and usefulness of the organization, not attained by the irregular and perpetually varying annual membership, which largely depends from year to year on the place of meeting of the society. This system of life membership will in no way interfere with our present arrangement of annual members, who pay the usual fee, and derive the advantages of participating in our meetings and securing early copies of the Annual Report. Our list of life members may grow slowly, but we may feel quite certain that in the near future it will attain respectable proportions, and add immensely to the strength and usefulness of the organization, and to the usefulness of our experimental station.

CATALOGUE OF BEST FRUITS, TREES, SHRUBS AND PLANTS.

The extended correspondence of this office continually brings to mind a defect in our annual volume. Fully nine-tenths of the most anxious and earnest readers of our discussions and reports continually

Digitized by Google

need for reference, a published list, in alphabetical order, in the preliminary pages of our report, in which in condensed tabulated form is given a brief description of all the more desirable varieties of orchard and small fruits, forest trees, conifers, ornamental trees and shrubs, and flowering plants. Even those of us who have in our library all the old and new Horticultural books and periodicals, would have occasion continually to refer to this list, as our fruit lists, and our trees and plants in general are in many cases *peculiarly our own*, and not one of us is familiar with the fruits, habits of growth, etc., of all our recommended varieties and species. This list could occupy two adjoining pages, with corresponding number on each page, to facilitate tracing the record in the columns headed at the top. In the respective columns would be given: of fruits, the relative size, form, color, quality, season, origin, use, and value, soil it succeeds best on, and part of the State for which it is best adapted. In our lists of trees, shrubs and plants an arrangement occupying the same space would give all the essential facts as to description, relative value, and uses. I am fully aware that the preparation of, and annual additions to, and revision of this extended list will entail a considerable amount of labor on some of our most skillful and experienced Horticulturists, but if we can thus advance best the interests for which we labor, we can freely contribute our mites. Such a tabulated list would soon become the most useful pages of our volume.

SECRETARY'S NOTES.

In my official position at the College, and as Secretary for several years of this Society, I receive during the year early advices relative to new fruits, and new or newly applied processes in all the divisions of our work. Some of these notes have appeared in the *College Quarterly*. If thought best such of these notes, extracts from letters, etc., as have a special interest will be incorporated in the annual report, to such extent as prescribed space will permit. The correspondence of this office has never been so extended as during the past year. I have sometimes thought it would be productive of great good, were the Society to publish for distribution an annual pamphlet giving the leading points relative to varieties, modes, and methods in fruit culture, selection and care of shrubs, etc.; something after the manner of our Forestry Annual. It would meet a growing demand for this kind of direct information on the part of our thousands of prairie settlers who never see our annual reports.

Digitized by Google

FINANCIAL STATEMENT.

I have expended during the year commencing January 21, 1879, to date of this report, amounts as follows:

OFFICE EXPENSES.

Stationery items at annual meeting	$ 2 90
Telegrams and express at annual meeting	2 30
Paper for annual Report	4 95
Books for indexing	40
Pencils and ink	1 20
Stamps to March 20th	4 00
Postage and express on manuscript and proofs	2 50
Twine and wrapping paper	1 50
Printing slips	75
Telegrams	75
Car fare—six trips to Des Moines	9 00
Board at Des Moines—ten days	17 00
Freight on books	2 94
Stamps for reports	24 00
Stamps, peddler circulars	3 00
Envelops for same	60
Mills & Co., paper	1 60
Envelops and letter-heads	7 50
Paper and pencils	75
Stamps, correspondence	18 00
Total	$ 105 64

FORESTRY EXPENSES.

Two trips to Des Moines	$ 3 00
Board at Des Moines	2 50
Paper wrappers	5 60
Paper wrappers	5 54
Express on pamphlets	55
Freight on pamphlets	1 19
Stationery	6 00
Postage, correspondence	8 00
Total	$ 32 38
Cash received for memberships	$ 36 00

Report of Secretary was, on motion, referred to committee appointed on President's address. The financial portion, by same motion, was referred to Finance Committee.

Report of standing committee on the Relataons of Botany to Horticulture, was called for.

Digitized by Google

SYNOPSIS OF A LECTURE UPON THE LEAF; ITS STRUCTURE, FUNCTIONS AND CLIMATIC MODIFICATION.

BY PROF. C. E. BESSEY, AMES.

GROSS ANATOMY OF THE LEAF.

The principal part of the leaf is the flat expansion, the blade which, in the case of the apple, consists of a single piece with slight indentations along the margins. Now, this is usually borne upon a stalk of greater or less length, for the purpose of bringing it into the air and sunlight. You will find, upon examination, that this stalk is a very variable thing. In one plant it will be found long, while in another of the same species or variety, grown under different conditions, it will be found short and thick. I will speak of this more particularly further on. Examining the blade we find that it is composed of two parts, which are easily distinguished by the naked eye. These parts are (1) the green pulp, and (2) the framework. The former is soft, and to the unaided eye, appears as a mass of softish green matter of a pulpy consistence, and you will observe that when exposed to the drying effects of the air, it rapidly loses the water which it ordinarily contains. The framework is hard and composed of interlacing fibres which run in every direction through the before-mentioned green pulp. It is this portion of the leaf which is retained in the process of making phantom leaves, with which many of you are doubtless familiar.

MICROSCOPICAL ANATOMY OF THE LEAF.

If now we bring the microscope to bear upon the question of the particular structure of the leaf, much light may be obtained. Thus, by means of the proper instrument, I can separate from each surface of the blade a thin, colorless sheet which is the skin or *epidermis* of the leaf. I place it under the microscope and use a power of from 400 to 500 diameters, and find that it is composed of cells of various shapes. The skin of the upper surface differs very much from that of the lower. That from the upper side has somewhat regular cells,

Digitized by Google

while that from the lower side has cells with extremely irregular outlines. This difference is well shown in the greatly enlarged figures upon my chart.

If, now, we make a section of the leaf at right angles to its plane so as to get a view of the skin of the leaf showing its cut surface, we find that the cells are empty; that is, they contain no protoplasm, nor any of the usual contents of living cells. They do not even contain water, but appear to be filled with nothing but air. Looking carefully you will observe that the boundary walls of these cells are greatly thickened in those parts which are external, while internally they are thin. This is the case, to a greater or less extent, in all leaves, except those which grow in the water, and it is a significant fact that in dry regions these outer epidermal walls are thicker than they are in moist ones.

In the apple leaf the skin of the upper surface is impervious, while the under skin is pierced with many exceedingly minute openings, the breathing pores, or *stomata*. The number of these openings in every square inch of surface is something remarkable, and were it not that the most careful counts have repeatedly been made, and verified with rigid exactness, we could hardly believe that so many perforations could exist. While they vary considerably in different leaves, we may put down the usual number as between 150,000 and 200,000 for every square inch of surface. Now it is impossible to grasp so great a number, much less to conceive of a surface pierced with so many openings. Perhaps we can get a better notion of how numerous the breathing pores are, by taking so small a surface as the head of a pin, upon which there would be no less than 700 pores. But this is even too large a number for us to fully grasp; turn the pin over and let us, by means of the micrometer, measure the area of the point. It is, you will admit, a pretty small area, and yet it is large enough so that upon an area of the under surface of the leaf no larger than this, four pores may be found. In other words, if you take a pin and bring its point lightly down upon the under surface of the leaf, the point itself will cover four of the breathing pores.

Suppose, now, that we make a cross section of the leaf and examine the green pulp of the interior. We find that it is composed of minute bags or sacks, each somewhat oblong in shape. Notice how these cells, as they are termed, are arranged. Just beneath the upper skin of the leaf they are packed so that they stand with their ends

Digitized by Google

toward the skin. You will observe that in the Red Astrachan apple leaf, there are three layers of cells which are thus packed. These cells, so packed, are called palisade cells, from their resemblance to the walls of a palisade, when seen in a section of a leaf.

From a personal examination of a considerable number of leaves, I am able to say, that the number of layers of these cells varies somewhat, being in some cases no more than two, and in rare cases running up to four. As a rule, the Russian varieties of apples have more of these layers than have the varieties from Central and Southern Europe. It is a rule, also, that the thicker leaved varieties have more palisade layers than the thin leaved ones. Below the palisade cells the leaf pulp is composed of cells which are somewhat irregular in shape, and which are packed very loosely, so that there are great spaces between them. These intercellular spaces are filled with air and are in communication with the outside air through the breathing pores previously mentioned.

Suppose now that we take one of the cells composing the pulp of the leaf, examine it with a very high power of the microscope, we find that inside of its walls it contains water, protoplasm, and a considerable number of green granules, the latter adhering to the cell-walls. These green granules give the color to leaves, and upon their greater or less abundance depends the more or less intense green color of the leaf. They are known to Vegetable Physiologists as chlorophyll granules.

THE LEAF AS AN EVAPORATING ORGAN.

One of the functions of the leaf is that of the evaporation of water from its surface. I am by no means certain that this is a physiological process; in fact I am rather of the opinion that it is not, but will not here undertake a discussion of this point. The fact of a considerable evaporation is well made out. All that you have to do to prove it, is to cut two small leafy twigs upon a dry day and then place one with its stem in water, while you simply wax over the cut surface of the other, to prevent evaporation from the wound; in a short time the leaves will have lost water enough to cause them to wilt, and in a little while the loss will be so great that the leaves will be entirely dried up. By care in an experiment like this, the actual amount of water evaporated may be determined with considerable accuracy. In the process of evaporation the water escapes almost entirely through

Digitized by Google

the breathing pores. If these are open the evaporation is greater; if they close it is greatly reduced. It has been held that the pores control evaporation; possibly they do, but I must say that if they do it can only be to a limited extent. I am, on the contrary, rather of the opinion that evaporation controls them. If the evaporation is little the interior tissues of the leaf become so distended with water as to stretch the epidermis and open the slit-like breathing pores, when on the other hand the loss of water by the interior tissues has been great the epidermis is relaxed and the pores close up.

THE LEAF AS AN ASSIMILATING ORGAN.

The great function of the leaf is to accomplish a sort of vegetable digestion; to take the carbonic acid gas, and a little of the water and to make out of these the material for the growth of the plant, and nourishment of the fruit. In order to avoid confusion botanists call this process assimilation. It only takes place in the leaves, and those parts of plants which have a green color. Close study of this process has shown that the active agent is the green substance which I have already referred to under the name of chlorophyll, the substance which we find in the cells of the leaves. It is found further that assimilation takes place only in the sunlight, and that when a leaf is put in the dark it is incapable of performing this kind of work. We may say then that vegetable digestion is a day process. During the night, however, the leaf is by no means inactive. In the darkness the surplus assimilated matter which has accumulated in the leaf is transferred to other parts of the plant, and there used for growth. Upon the return of light the work of the leaf is again resumed, and so the means for further growth provided.

Now while it is a fact that some substances, as the earthy matters, are not taken to the leaf for assimilation, it is nevertheless a fact that there can be no continued growth without the assimilating action of the green leaf. Just as in animals some substances are taken directly into the system without digestion, so it is in plants, but in neither case is it possible for growth to go on long without the process of digestion. From what has been said it is clear that the leaf is one of the most important of the organs of the plant, and it is equally evident that upon its healthy action must depend the health and vigor of the tree. You may as well expect to have healthy animals, if their

Digitized by Google

stomachs are continually out of order, as to have healthy trees with unhealthy and inefficient leaves.

Now then let us for a brief time turn to some of the practical applications of the foregoing facts and principles.

It is a well known fact that different conditions of the air require different conditions of structure in the leaf. Thus a dry air requires a thick leaf, or it will be dried up and killed, while on the contrary a moist air requires a thin leaf in order that it may perform its functions best. Take the thin leaved plants of the green-house or propagating pits and put them at once into the dry air of our Iowa prairies and see how soon they will wilt down. On the other hand it is well known to green-house men that thick leaved plants will not thrive as well when grown in a damp atmosphere.

Without prolonging this synopsis unduly we may formulate the matter as follows:

1. Dry air and thick leaves go together; moist air and thin leaves.
2. Dry air and short leaf-stalks go together; moist air and long leaf-stalks.
3. Dry air and a dense texture of the leaf go together; moist air and a loose texture.

By taking into consideration the foregoing facts and principles we may often be enabled to predict whether or not a particular species or variety will endure this or that climate. Taking the conditions which we find in Iowa, it is evident that we must look for varieties with thick leaves, if we hope to find those which well withstand our hot dry summers.

DISCUSSION ON REPORT.

Mr. Foster: Can a plant be grown successfully in artificial light?

Prof. Bessey: Yes; it may maintain feeble life and growth, something in the way that a man may exist in a dungeon.

Mr. Speer: Are we to understand from the lecture that a plant does not grow in the night or on cloudy days?

Prof. Bessey: Most assuredly the plant grows at night, and if the temperature and other conditions are favorable, it may grow with greater rapidity than during the day. Digestion is one thing; growth is quite another. Assimilation in the leaf in the sunlight is the making of the brick; growth is the piling them up into methodic and orderly structures. Plants do most hay-making when the sun shines. But the plant may perform, less vigorously, the work of assimilation

Digitized by Google

in cloudy weather by reflected sunlight. Extension of growth is usually most rapid at night when least active work is going on in the leaf.

Mr. Lathrop: Does the assimilated sap return mainly in the newly formed cell structure, and does the crude sap pass up from the roots mainly in the older cell structure?

Prof. Bessey: It is a popular error to suppose there is an actual flow of sap as in the circulation of the blood in animals. The watery particles pass up from the roots because there is more or less rapid evaporation from the exposed leaf surfaces. In about the same way the oil passes through the wick to feed the flame at its upper extremity. But there is no distinctive return flow of fluids. The materials for cell structure elaborated in the leaf pass to their final place of deposit as the minnow floats in a pipe of water. If this material for the building and storing of new cells seeks its passage in the newer cell formation, it is only because the cell divisions are at this point thinner than in the older structure.

Mr. Dixon: It seems quite clear to practical fruit-growers that the elaborated sap returns mainly in what we call the cambium layer, as when we *ring* or *wire* a branch to induce fruiting prematurely the growth takes place wholly above the ligature or ringing.

Prof. Bessey: While *sap*, properly so called, does not pass downward, it *is a fact* that the assimilated matters, as starch, sugar, etc., *do* pass down by diffusion through the watery parts of the twigs and trunk. This diffusion takes place most easily and most rapidly through the new cells in the cambium layer, and on this account, if we tie a wire tightly around a growing stem or branch, so as to constrict the cambium, we will to a great extent prevent nutrient matter from diffusing below the point so restricted. The swelling up of the upper side is an effort on the part of the stem to bridge over the difficulty. That it is not due to the weight of a supposed descending sap, is shown by bending a twig down so that it is exactly reversed. If now a wire be tied around it, the bulging will be below the wire, that is on the side of the wire farthest from the tree, but on the under side with respect to the earth.

On motion, the Society now adjourned to meet at nine o'clock in the morning.

Digitized by Google

MORNING SESSION.

WEDNESDAY MORNING.

Session opened at nine o'clock.

The fruit and floral exhibits were now neatly arranged in place, and were very creditable to the Society and the State.

The committees were announced for the awarding of premiums on fruits and flowers, as follows:

Committee on Flowers.—Messrs. Wright, Hard and Kemble.

Committee on Canned Fruits.—Messrs. Wright, Raymond and Graves.

Committee on County Collections of Fruit.—Messrs. Calkins, Raymond and Hilton.

Committee on Individual Collections.—Messrs. Brackett, Strohm and Shaw.

Committee on Seedlings.—Messrs. Foster, Speer and Haviland.

Committee to Report Rules on Fruit Exhibits.—Messrs. Wright, Bracket and Speer.

Mr. Brackett now offered, for the guidance of fruit committees, the rules framed by Dr. Warder for the use of the Ohio State Horticultural Society, and moved that they be adopted.

Mr. Calkins: The rule of our Society excluding plates from counting in sweepstakes collections which had formed a part of a special collection, or as single plates, was hastily adopted by our Society. It is not in accordance with usages in other well organized societies, and should be amended.

On motion, the Ohio rules were referred to the committee appointed to report rules for fruit exhibits.

The committee appointed to draft obituary notice of death of Robert Avery, now made report as follows:

IN MEMORY OF ROBERT AVERY.

In youth, middle life, and old age we are subjects of death. It is now our sorrowful duty to record the death of Robert Avery, who died on the 30th of December, 1879, at his home in Des Moines

Digitized by Google

county, seven miles west of Burlington, aged eighty-three years and ten months.

Mr. Avery was the first and oldest nurseryman and orchardist in our State. His early and ripe experience has been of great service to succeeding tree and fruit-growers. He encouraged and supplied trees for the planting of more fruit trees from twenty-five to forty years ago, when the country was new, than any western man of that time.

Always acting on the principles of truth and honesty, his aim was to propagate and sell only the varieties known to be valuable. He was of great service in correcting the many errors in the names of the fruits of these early days, and in training young men in the modes and methods of propagation, with a view to the starting of much needed nurseries in the new country.

In him we knew the true type of a philanthropist, a friend, and a christian. May the members of this Society love, honor, and follow his examples.

Resolved, That this Society tender to his family and many friends our deep sympathy, and with them mourn his death.

Resolved, That a copy of this memorial be sent to his family, and also that it be published in our volume of reports.

Signed, SUEL FOSTER,
J. N. DIXON,
H. STROHM,
Committee.

Resolutions unanimously adopted.

Report of the eighth district was now announced.

REPORT OF DIRECTOR OF EIGHTH DISTRICT.

BY HON. R. P. SPEER, CEDAR FALLS.

Mr. President—A freeze on the 6th of last May caused almost a total failure of currants, gooseberries, and plums in the eighth district, and injured the grapes and cherries so much that they produced less than half of an average crop. The raspberry crop was very light also; but whether the partial failure was caused by the May freeze, or by

Digitized by Google

other causes earlier in the season, I cannot say. Our strawberry crop was also less than usual.

In Black Hawk county we had not only enough of summer and fall apples for home use, but many were shipped to other places. The Duchess of Oldenburg, Cole's Quince, Sops-of-wine, and Ben Davis produced a full crop. Fameuse, Jonathan, Willow-twig, and Red Astrachan less than half of an average crop, and other usually reliable varieties scarcely any fruit at all. Apple trees of all varieties came through the winter of A. D. 1878–9 in good condition, except Ben Davis. The remarkably warm weather which we had in March caused the sap of the Ben Davis to become liquid; and subsequent freezes caused the bark of many of our oldest trees of this variety to cleave from the wood to such an extent that in most instances the injuries have already proved, or will soon prove, fatal. Many of the varieties in our oldest orchards have proved unproductive, and a large proportion of them have been changed within the last year or two, by top-grafting with other varieties, which have proved more fruitful. But only a little observation is necessary to convince a man who has had much experience that most of the fruit growers of Iowa do not know how to properly change the top of an old tree to another variety; or how, or when, to prune. It should be generally understood that a wound which might not seriously affect a fruit tree near Lake Michigan would prove fatal in Iowa. Limbs should not be cut from fruit trees which are larger than a man's finger, either when they are being grafted or pruned. But few varieties of the apple can be successfully grown in Northern Iowa when root-grafted; and if more varieties should be wanted, no better stocks can be selected on which to top-graft them than Gros Pomier and Plumb's Cider. Perhaps no injury may result from pruning fruit trees at any time between fall and spring where the winters are not severe and the atmosphere is moist; but I have learned from many years' experience that there is but one "right time" to prune in Iowa, and that is after the leaves appear in the spring, and before they attain full size. If done then the trees have the entire summer in which to cover the wounds with new wood; but if done in the fall the bark will be killed back from one-quarter to one-half an inch from the edge of the wounds before spring. If pruning should be done after the cold weather has passed and before the leaves appear, a thin, watery sap will flow from the wounds, which will stunt the tree and cause disease. When it shall become necessary to remove limbs from trees the cutting should be done close to the main

Digitized by Google

limbs upon which they are growing, as stubs which are frequently left never heal over.

There is much difference of opinion among fruit growers as to how high the tops of fruit trees should be formed above the ground. The arguments which are usually offered in favor of low tops are plausible, but I have found that the opinions of most men upon this question are very liable to change when their trees begin to crowd each other in the orchard. When fruit trees become large enough to bear full crops it is necessary that there should be sufficient space under them to allow the passage of unobstructed currents of air, and render it convenient to gather and haul the fruit from the orchard. The base of the limbs of very upright growing varieties of trees should not be nearer to the ground than four feet, nor less than five feet when the trees are of varieties which are inclined to spread.

No distance can be named as the proper one between trees in an orchard, because varieties of trees differ very much in form and size at a given age. For instance, twenty feet would be far enough apart to plant such varieties as Tetofsky; twenty-five feet would be about the right distance between Duchess of Oldenburg trees; while thirty feet would not be too far apart to plant varieties which make a more vigorous growth and have spreading tops. For small orchards, where a number of varieties are to be planted, perhaps we could suggest no better distance between trees than twenty-seven feet.

Fruit trees cannot thrive in a soil which will contain stagnant water for a considerable length of time in wet seasons, or which is so hard that atmospheric air cannot circulate freely through it. Therefore, drainage is necessary, and before fruit trees are planted the plat or field on which they are to be set should be plowed as deep as possible with three good horses; because if the ground should not be properly prepared then, it will be impossible to put it in good condition afterward.

It is important that fruit trees should be planted neither too deep nor too shallow; and what the proper depth is will depend upon the qualities of the soil. A good orchard soil consists of clay, sand, and decomposed vegetable matter, in such proportions that it will be neither too adhesive nor too porous, and should rest on a subsoil of yellow clay which contains sufficient sand to render it porous. Many varieties of the apple have proved unprofitable on soils which appeared to be good in every respect, because the surface soils were too deep. Trees require a certain amount of decomposed vegetable food materials, which they obtain in the surface soil, and they require, also, a certain amount of mineral food

Digitized by Google

material, which exist principally in the subsoil. Therefore, where the surface soil is too deep, they will be unable to extend their roots far enough into the subsoil to procure the quantity of mineral food which they require. A surface soil which is twelve inches deep is more suitable for fruit trees than another that is twenty inches deep; and for the reason just given, many varieties of the apple and other kinds of fruit have proved worthless on surface soils that were deeper than twenty inches. Fruit trees should be planted on a good orchard soil, so that their collars (the point where their bodies and roots join), should not be more than four inches below the surface of the ground. On very sandy soils they should be planted six or eight inches deeper; because if trees are not planted deep on very sandy soils they would suffer for want of moisture in dry seasons, and their roots would be injured by cold during severe winters.

There are but few places on our prairies where the soil is adapted to many varieties of the apple or other kinds of fruit; yet there are a few varieties of the apple so constituted that they have proved hardy and profitable on sand knolls, and there is a limited number of varieties, also, which are well adapted to the cold wet soils which are found around the heads of our sloughs. Then, if there are a few varieties of the apple which are adapted to warm, porous sand knolls, and a few others which are adapted to cold, wet soils, it would be unreasonable to expect that there are no varieties specially adapted to the different grades or kinds of soil which are between the sand knolls and the heads of sloughs. But such statements are worth but little to persons who have not given the soil question much attention, unless accompanied by facts. We have been told by Samuel Bowers, Esq., and other good judges of fruit, that at Cedar Rapids, on sandy ground, the Gros Pomier had proved hardy and productive, and that the fruit is highly colored and of good quality. The experience of Mr. Dunson, of Butler county, and Mr. Ellis and others, of Black Hawk county, with the Gros Pomier on sand knolls is similar to that of Mr. Bowers. As grown by myself and others on deep, moist, heavy soils the Gros Pomier has proved hardy, but not very productive, and its fruit has been neither highly colored nor of good quality. I have thirty beautiful Tetofsky trees growing on a heavy, damp soil near the head of a slough which have proved early, profuse, and constant bearers of even-sized, salable apples. On very light, dry soils the Tetofsky has proved to be a remarkably slow grower, has a scrubby appearance, and has produced but little fruit. The Duchess of Oldenburg has proved an

Digitized by Google

early, profuse, and constant bearer on all soils, but on the rather wet, deep, heavy soils it has made the most satisfactory growth. The Red Astrachan has proved unfruitful in Northern Iowa, except upon thin, dry soils, which have yellow clay subsoils. On rich, black soils, which are deeper than twenty inches to yellow clay, or on very sandy soils in Black Hawk and adjoining counties, the Ben Davis has proved tender; while on good orchard soils thus far it has proved to be a good tree. The Fameuse, Cole's Quince, Sops-of-wine, and Plumb's Cider can be grown successfully on soils which vary very much in depth; but they are not adapted to very sandy soils, or to the heavy, damp soils which are most suitable for the Tetofsky or Duchess of Oldenburg.

All varieties of the cherry have proved unfruitful in the eighth district, except on sandy soils, or on the thin clay soils on our river bluffs.

The Miner plum has also proved unfruitful, except upon thin, clayey soils.

When fruit trees have been well mulched with straw or other similar materials they have been less liable to blight or to be injured by cold during severe winters, than others which were not mulched. But frequently it is difficult to procure sufficient quantities of straw or old hay to mulch large orchards as often as they require it.

After much observation I believe that orchards should be cultivated annually for six or eight years after being planted, and then if other mulching materials cannot be conveniently procured the trees should be well mulched with coarse creek or river sand. It is cheap, durable, insects cannot harbor in it, the ground would not bake under it, and it would prevent weeds or grass from growing near the trees. I mulched three hundred of my oldest apple trees with sand last season, and will mulch six hundred more of them with it next season.

More orchards were severely injured by blight in Black Hawk and adjoining counties last season than in any previous year. Trees growing on rich sandy bottoms suffered most, and those which suffered least were on higher ground which was shaded by clover or buckwheat.

I am of the opinion that the Red Jacket and Wilson strawberries have given more solid pleasure and profit than any other varieties which have been grown in Black Hawk county.

The following simple experiment would convince most persons that salt is good for strawberry plants: In an out-building place an open barrel of salt, and within ten feet of it also some highly-polished car-

Digitized by Google

penter's tools. In a few days it will be found that the salt has attracted more moisture than is good for the tools, but perhaps not more than would be required by strawberry plants.

DISCUSSION ON REPORT.

Mr. Speer: I wish to add a few words relative to the use of sand for mulching orchard trees with a view to drawing out some discussion on the subject. I prefer the plan of sowing buckwheat in orchards if the process could be repeated year after year. But I find that after three or four years' repeated sowing to this crop it does not amount to much, either in the way of soil shading or as a crop. I have now sowed the orchards to clover and mulch around the trees with sand. I have reason to think this plan will prove favorable to the health of the trees and profitable crops of fruit.

Mr. Foster: Why do you recommend early corn in young orchards?

Mr. Speer: Because the early varieties are all of small growth. I would prefer potatoes among the trees but, as with the buckwheat, I fail in securing a paying crop more than two or three years in succession.

Mr. Foster: I prefer the corn to potatoes in newly planted orchards. Corn shades the ground and seems to aid in ripening the trees at the close of the season. I have thought too the digging of the potatoes in the fall tended to start a new growth in the trees, especially if the weather at that time was warm. I have had some sorry experience in the late culture of orchards. I much prefer the weeds to late culture in orchard or nursery. As to using sand as a mulch around orchard trees, I cannot see any good reason for incurring such expense. Our Muscatine weeds would not be kept down in this way unless the sand was very thick.

Mr. Speer: D. W. Adams always favored dense weed growth in orchard. I fail to see any benefit from this slovenly management. A covering of foxtail renders the soil in August about as hard and dry as a timothy sod. Clover is different in character. Like buckwheat it derives its support largely from the air, and its deep extending roots keep the soil cool, moist, and porous.

Mr. Patten: In Mitchell county we have an orchard that has blighted very badly the past season. The orchard was cultivated early and grew up to weeds in latter part of season. I notice little differ-

Digitized by Google

ence as to tendency to blight on varied soils. I can see little, if any, benefit that can result from the plan of sand mulching. If excessive heat has anything to do with blight the sand would rather be an injury than a benefit. The wash of lime and sulphur is rather gaining ground at the north as a possible preventative.

Prof. Lummis: I had a large orchard in Southern Illinois, on clay soil, with thin loam on top. The soil was favorable to ligneous growth in forest or orchard, but in the latter the growth was made early in the season, as the ground during summer became very dry and hard. On such soils a mulch of any material that would keep the surface soil from baking would prove an undoubted advantage. I do not doubt that the sand mulch on such soils would be beneficial.

Mr. Speer. I hope others will try, on at least a small scale the plan I suggest. I cultivate with corn and buckwheat until the orchard comes fairly into bearing, and the trees have attained some spread of top, I then seed to clover and mulch around the crowns with sand. But the mulch as yet is only a theory. The sand when exposed to the sun may heat some on top, but the soil under it will always be cool and moist, just as it is under a thin flat stone. We must, as far as possible, imitate nature. The wild crab never blights in our thickets with a natural mulch of leaves. But exposed to currents of hot air, and with the surface above its roots heated on account of exposed surface it blights like our other crabs. The Black oak is all right in the natural forest. But with soil hardened and tramped with stock, and the sheltering underbrush destroyed, it also blights and dies.

Mr. Bruner: I have had a little accidental experience with sand mulching. I had a row of pear trees on light prairie soil, underlaid with yellow sand, which we use for plastering. One tree on this row was quite heavily mulched with this sand. The trees all died except this one, and have been replaced with chestnuts. The pear tree has grown very slowly. I mulched some of the chestnuts with sand, but they looked so badly that I took it away.

Digitized by Google

PLANT BREEDING.

BY J. L. BUDD, AMES.

Mr. President and fellow members—The topic assigned me in the programme was "New Fruits." The new fruits coming under my notice during the year have been reported mainly in the "College Quarterly," which I think has been received by most of the members of this Society, and these notes with the consent of the Society will be incorporated in our annual report. Many of these fruits will also be reported upon at this meeting, or be called up in our discussions.

It may prove more profitable at this time to present a few quite well settled principles in plant breeding. While the stock-growers of this country and Europe for many years past have made the subject of systematic stock-breeding a leading topic in their journals, and at their conventions, our fruit-growers as a rule seem totally to ignore the possibility of methodic tree and plant breeding with a view to gaining desirable results. A mere outline of reasonably well established principles in this line would consume more time than it would be proper to give the subject at this time.

I only propose to offer a few suggestions on a single phase of the topic, viz.: The systematic improvement of our fruits by scientific seedling production. I use the word scientific, as this line of study so intimately connected with our work as horticulturists has received the most patient attention of many noted scientists, and their united conclusions should not be ignored in our discussion or experimentation in this direction. I hope to be criticised severely if my conclusions conflict with the experience or observations of members or others present. The interchange of views on such questions will tend to encourage habits of close observation.

I can best attract attention to the views I wish to impress by commencing with a brief report of apparent results attained in an experiment to which some of the members present gave some assistance.

Two years ago last spring seeds were planted on the Agricultural College Farm of about eighty varieties of the apple. These seeds were taken from select specimens of fruit of the leading varieties grown in

Digitized by Google

Central and Northern Iowa. The seeds of each variety were sown separately and carefully labeled.

The past autumn, while the leaves were still perfect, each lot of the seedlings was carefully inspected as to character of leaf and bud, relative vigor of growth, and all other known indications of inherent stamina and ability to stand our trying summer and winter conditions. The carefully recorded results of this examination confirm in many respects the conclusions reached by Andrew Knight, one of the most methodic and careful experimenters and observers of modern times. Summarized, Mr. Knight deduced from his manifold experiments these conclusions: 1. In habits of growth, hardiness, and habits as to time of maturity of wood in autumn, seedlings usually follow the female parent. 2. Where the female parent is a determinate and fixed type not far removed from its native form, its seedlings follow more nearly the parental form than do the seedlings of varieties far removed by crossing from original forms of the species. In accordance with this view he secured many of his most valuable varieties by using the pollen of choice varieties on blossoms of the Siberian and other North of Europe crabs. The experiments and observations of G. P. Peffer, of Wisconsin, who presents a paper at this meeting, also tend in the same direction.

The few seedlings of Duchess, Irish Peach, Plumb's Cider, Gros Pomier, and Belle de Havre, show in leaf, bud, and habits of early maturity, the leading traits of the varieties producing the seeds. The seedlings of Dyer, Early Joe, Benoni, Fall Orange, Fameuse, Ben Davis and Walbridge are mixed in character of leaf, bud, and marks of inherent vitality, to an extent perfectly surprising to those who have given the matter no attention.

The seedlings of such sorts as Sweet June, Early Pennock, Rambo, Rhode Island Greening, Jonathan, Dominie, etc., are weak, feeble, and destitute of the evidences of stamina to an extent that should learn us an important lesson.

We can already be certain that not one of the seedlings of the latter class of apples will ever endure our climate as well as their parent trees.

The second class, as to hardiness, enumerated, may give an occasional seedling nearly as hardy as the parents.

The iron-clads, first named, show quite uniformly a better grade of

Digitized by Google

seedlings, but we have yet to learn that a single one of them will ever establish a record for hardiness equal to its maternal parent.

We at no time must forget that the Duchess, Irish Peach, etc., are not original forms of the apple. The size and quality of their fruits, we have most undisputable proofs, are derived from crossing native northern forms with varieties of more southern and equable climes. Propagated by budding or grafting, the best of the Russian varieties may be perpetuated as iron-clads. If we attempt to reproduce them by seedling production, we may rest assured that the stock from whence the improved character of fruit originated will manifest itself. We now have several seedings of the Duchess bearing fruit at the west. Almost uniformly the trees are hardy, but, like the Pewaukee and the Clark's Orange—two of the best known of its seedlings—they are hardy in the sense that Ben Davis or Fameuse are hardy. Not one of them is yet known as a true iron-clad.

We shall expect the seedlings of the Gros Pomier and Plumb's Cider to be uniformly less hardy than the parents on account of the double cross in their fruit with southern forms of the species.

Yet, I do not mean that seedlings from such varieties of the iron-clads may not prove as hardy as Utter's Red, Ben Davis, and others of that grade suitable for culture in the central district. They may, indeed, prove decided acquisitions on account of their *improved form of fruit*, if the cross has been judicious.

But my object at this time is to discuss the principles involved in the production of strictly iron-clad varieties which will produce fruit of good size and quality. I can best get at the ideas involved by a hasty presentation of a few familiar examples.

Peter M. Gideon, of Minnesota, produced the Wealthy from seeds of crab obtained from Maine. Here we have an authentic case of sudden development of beautiful fruit of good size and quality from a primitive form, yet the tree retains to the fullest extent the inherent cell structure of wood and leaf, and habits of early maturity in autumn, of its maternal ancestor of the Astrachanica form. It is well to remark for our guidance that Mr. Gideon still labors under the mistake that the Wealthy is a cross of the common apple on the Siberian crab. The real facts are, that in Canada and Vermont, at an early day, one of the forms of the Astrachan crabs was introduced, from which has emanated the great number of thick-leaved crabs we have introduced from these sections. The Wealthy has sprung from this form of the

Digitized by Google

crab, as evidently and as surely as has the Wolf River, Whitney's No. 20, and several of the Vermont and Canada varieties.

I may here note that the Tetofsky comes very near to the original form of the Russian crab. Dr. Arnold, in the list which he has sent from Moscow, gives it as a crab, and for many years it was grown as a crab in Vermont and Canada. What we know as the *Virginia crab*, is another genuine sample of the Astrachanica crabs, the maternal parent of many of the Russian apples.

Another prominent example of sudden development of a primitive form is presented in some of the seedlings of the Chinese Sand pear. A number of years ago the Sand pear was accidently introduced in some of the Eastern States, and soon attracted attention on account of its unique, thorn-like leaves, its beautiful orange-like fruit, and its apparent immunity from all traces of leaf- or fire-blight. Its fruit was not fit for eating, but it was soon found that it had a value for culinary use, even where a better grade of pears were grown, on account of its aroma and quince-like flavor. Its seeds, from trees contiguous to those bearing fine fruit, were planted, and behold! we have at one bound a metamorphosed fruit as to size and quality; yet the trees follow, in leading characteristics, the mother form, and are now commanding fancy prices, as probable blight-proof varieties.

Still again, the south of Europe form of the grape, at an early day, was found too fragile in leaf, and delicate in habit, to stand our rough climate. Passing over the accidental origin by natural crossing of valuable varieties from our wild form of the grape, the methodic experiments of Mr. Rogers, of Salem, Mass., present us with a fine illustration of the point we wish to make. He artificially fertilized the anthers of the Wild Sage grape with the pollen of Black Hamburg and White Chassellas. When the seedlings from this cross came into bearing a magical change was wrought in the fruit. By sudden and mysterious development, as in the cases before noted, the worthless native fruit was transformed into large, beautiful, and luscious specimens, while the vines retained fully the inherent vim of the mother form. Indeed, some of the Roger's Hybrids I have found hardier in our climate than the Sage grape. Had the mother form in this case been truly hardy in sections remote from large bodies of water, we would have had, as the results of this experiment, grapes of far better size and quality than we are likely to get, until some one repeats the experiment with a truly iron-clad maternal form of the vine.

Digitized by Google

The varieties of the strawberry now exciting the wonder of our middle-aged members, who thought in their early experience the Boston Pine and Necked Pine to be wonderful acquisitions, have an equally instructive history.

Mr. Hovey sent out, in 1834, a variety which marked the new era in strawberry growing, under the name of Hovey Seedling. In leaf, growth of root, and vigor, it was about a full blooded native, but its fruit was transformed, as in prior cases, in size and sweetness, by pollenizing with the South American species *(Fragaria grandiflora)* a species perfectly worthless in its pure form for culture in this country, on account of its delicate habit. Following the Hovey came in succession the treasures which now are found in our gardens. In every case the truly valuable varieties are those with the leaf, low crowns, and deep extending wiry roots of our native species, modified in fruit by the South American species.

The Jucunda, Triumph de Gand, and one or two other varieties succeeding in some sections by the hill system of culture, are crosses, following in *crowns* and *roots* the Southern species; but the leaf is modified to an extent permitting it to stand our air.

If space permitted, I would like to add dozens of cases reported in European reports of Van Mons, De Jonghe, Knight, Lindley, and other noted experimenters, confirmatory of this doctrine of sudden transformations in flower and fruit by crossing on forms not far removed from natural condition as to inherent vim of tree or plant.

It would also be instructive to refer to the conclusions of Darwin, given in his wonderful new book on "Cross Fertilization," which embody the results of many years of patient and methodic observation and experimentation.

I cannot even give space at this time to the supposed opposition of such men as Pearson, Dean Herbert, Gaertner, and others, to the doctrines here advocated. In reality, they only assume that the male element is prepotent in the modification of flower, fruit, and some of the leaf markings. They say nothing of the phase I am discussing, of crossing with view to production of hardy varieties.

I will only add a few hasty suggestions as to promising directions for experiments in seedling production.

If any member of this Society or other owner of a homestead in Iowa, in village, city, or country, has a tree of Soulard, Tetofsky, Whitney's No. 20, Virginia, Maiden's Blush, Winter Gem, Lake Winter, Sunbeam, or other thick-leaved, nearly blight proof crab, fruiting

Digitized by Google

near desirable winter varieties of the apple, I advise him *to plant the seeds*, in full faith, that his chance for securing valuable varieties for prairie use from such sources, is ninety-nine per cent better than from seed plantings from best specimens of best varieties.

As to pears, I do not know that we have yet fruiting in the State any of the northerns forms of the pear, but some of the pears used for making perry in Europe, have some of this blood—to use friend Foster's word—in their composition. So, here and there we find a seedling from imported seed, bearing worthless crab pears, yet hardy and blight proof in tree. If such a tree fruits near better varieties, do not fail to plant its seeds. As soon as the iron-clad Russian pears bear fruit, under such circumstances, let every seed be utilized.

If you have a vigorous, free-growing, plum tree of our native species fruiting where it may be pollenized by a foreign variety, plant the seeds.

If you have a tree of our native Bird cherry, of the Rocky mountain cherry, or of the hardy Wild Morrello, found in some northern counties, fruiting contiguous to Richmond, English Morello, or the Dukes, plant their seeds.

If you have a truly iron-clad native raspberry fruiting near a choice variety, plant its seeds.

If any member has a vigorous native gooseberry bush fruiting near one of the best foreign varieties, which has been petted as a curiosity, don't fail to plant the seeds.

If you have Colfax, Ida, or other rampant growing native variety of the strawberry growing near foreign sorts like Jucunda, or Triumph de Gand, plant their seeds.

In all these cases, and scores of others which might be added, never be tempted to reverse the operation and plant the seeds of the choice variety, fertilized by the primitive forms. This has been the common mistake of our experimenters.

In these possible natural crosses giving promise of great results, I have said nothing of removing anthers of the blossoms of the mother forms.

Our united experience, and the combined recent observations of European experimenters, confirm the great central thought of Darwin's new work on Cross Fertilization, viz.: That most plants are constructed on the principle of cross fertilization. In hundreds of cases Darwin shows that even in cases where a flower has been fer-

Digitized by Google

tilized by its own pollen, and afterwards fertilized by pollen of another variety of the same species, the pollen of the latter proved *prepotent* in the modification of flower and fruit. Under such circumstances it would be folly to assume that all of the seedlings would be modified, or that all of the modified ones would prove valuable. In the cases suggested of a cross of species, but one seed in a thousand might give us the treasure for which we seek, but that one would prove an advance not possible to reach by ordinary seedling production.

If these views are well founded THEY ARE WORTHY *of the careful consideration of this Society.*

DISCUSSION ON REPORT.

Suel Foster: It seems to me that too much stress is laid by this report on the fruits and trees of Northern Europe and Asia. I do not see that this position can be supported. We surely have hardy fruits which did not come from this source. We are quite likely indeed to receive hardy fruits from the South. The Ben Davis and Gros Pomier came to us from the South.

J. L. Budd: It will be noted that in no case do I assume that we may not receive valuable iron-clad fruits from the Southern portions of our own country or Europe. The Duchess, Red Transparent, Yellow Transparent, Alexander, and other Russian apples, have been favorite varieties in some parts of England for over a century. In other parts of Southern Europe may be found, without doubt, many other varieties of the northern forms of the apple. The Gros Pomier came to us from St. Louis, where it is still a popular variety. But it came to St. Louis directly or indirectly from Sweden. The only point I wish to make, is the one so well made in the lecture of Prof. Bessey, that the varieties succeeding on the prairies must have the leaf and habit of growth of the northern races of the apple. The same idea holds good with the pear and all our fruits and trees. A seedling from the Sand pear may prove hardy at the north, although it originated at St. Louis, or even in Florida. In fact I believe that the breeding of hardy fruits for the north should be done far enough south to enable us to secure the pollen of first-class fruits with which to fertilize the blossoms of hardy primitive forms.

The leading points of the following valuable paper on the newer varieties of the strawberry and raspberry by the Secretary of the Illinois State Horticultural Society were now presented by the Secretary.

Digitized by Google

VALUABLE SMALL FRUITS OF RECENT INTRODUCTION.

BY O. B. GALUSHA, MORRIS, ILL.

To the President and members of the Iowa State Horticultural Society—In complying with the kind invitation of your Secretary to give a few notes upon the new varieties of strawberries and raspberries allow me to say at the outset, what many of you doubtless have satisfactorily proved, that the strawberry plant is the most discriminating of all fruit-plants of common culture in regard to the composition and texture of soils, and fully as sensitive as any to atmospheric influences; so that what may be said in this paper of the characteristics of any variety as exhibited on my grounds may not be found in all respects (and quite probably in some important points), descriptive of the same variety in another locality and growing in dissimilar soil. Success in strawberry culture depends, however, so much upon *treatment* in any soil or locality that, if I were writing this paper for the sole benefit of novices in this branch of horticulture, I would give some *generally applicable* directions for cultivation; but my own experience of nearly thirty years in growing this delicious fruit has taught me—and doubtless your observations have lead many of you to the same conclusions—that very many varieties require some particular treatment to develop their greatest excellencies which is not adapted to others.

For this reason I will only speak of some special fertilizers adapted to certain varieties, assuming that you all know that to attain success in strawberry culture the soil must be at least moderately rich and deeply pulverized and comminuted, and the plantations fed from year to year with fertilizing elements.

VARIETIES.

Parmelee's Crescent—Has been three years in cultivation, and each year it has gained fresh laurels from those who have intelligently and faithfully cultivated it; and also much abuse, amounting to the cry of "humbug" from shiftless cultivators who imagine that it is the duty of every plant, when once put in the ground, to thrive and cover itself

Digitized by Google

with large luscious fruit without further attention. Where cultivated in narrow strips (all runners which extend beyond their limits being ruthlessly destroyed) and fertilized by some strongly staminate sort like Wilson, Charles Downing, or Capt. Jack planted in *close proximity* to them—say one strip of Downing to two or at most three of Crescent—this variety has produced more of fine, large, beautiful fruit upon a given surface of ground than any other variety in cultivation. The fruit is eagerly sought in market on account of its fine size, bright, glossy appearance, and refreshing flavor. In my neighboring market it brought two and a-half cents per quart more than good Wilsons, and when shipped to Chicago—eighty miles—upon the same days with the best Wilsons, brought $1.70 per 16-quart case, while the Wilson sold for ninety cents per case of same size. As may be inferred from these remarks, the blossoms are pistillate, or nearly so, and hence must have hermaphrodite or staminate sorts near, or the fruit will be small and imperfect. Young plants of this variety are light, slender, compared with most other sorts, but so tenacious of life that nearly every plant lives when transplanted, and soon becomes strong. The fruit of the Crescent is only of moderate firmness, scarcely as firm as that of Charles Downing. The flavor is brisk and refreshing, not rich, but with the peculiar and agreeable aroma of the wild strawberry. To eat from the vines there are several varieties accounted better, but upon the table, "smothered in cream," with the requisite amount of sugar, they please as many palates as any other variety grown.

Miner (or Miner's Great Prolific)—This most excellent variety originated with the late, and universally lamented, T. B. Miner; and it is well worthy the worthy name it bears. The plant is robust, and very productive; flowers perfect; fruit very large, with a rich, moderately acid flavor. I look for an increasing popularity for this variety. One writer who "has one hundred and forty varieties" in cultivation has already placed it at the head of his list as "the most promising variety" on his grounds. On my own grounds it succeeds well on both sandy land and on a mixed soil—sand, clay, and humus. I shall largely increase my plantations of this variety.

Sharpless—The plants of this new candidate for first rank are very luxuriant and strong, and generally very productive; the blossoms are perfect; fruit of nearly the largest size, brilliant in color, rather firm in texture, with a refreshing, moderately rich acid flavor. It will command a high price in the market. The "behavior" of this variety upon my grounds justifies nearly all the high enconiums which many

Digitized by Google

reliable cultivators have lavished upon it, and yet I am not prepared to place it at the head of my list, as there are a number of new varieties which, *grown here*, combine more excellencies. It will doubtless fully meet the hopes of a large majority of planters.

Continental—Is a fruit of great excellence, rich, of fine size, rather late in season, and the *firmest* berry upon my grounds. The plant is a medium grower, but quite productive.

Cinderella—Usually accompanies Continental, as they were born together, and have usually been classed together and planted together. The plant is thrifty, hardy, and a most abundant bearer; fruit a little larger than Wilson, which it much resembles in appearance, though in this case, as in many others, "appearances are deceitful." It ripens early and is an excellent fruit in quality and of sufficient firmness to admit of carriage to neighboring markets. The blossoms are self-fertilizing.

Duncan—Is an early sort of great promise; it has thus far surpassed my expectations. The plant is exceedingly robust, with heavy and persistent foliage, and bears fine crops of large fruit, quite even in size, and of excellent quality, ripening a little earlier than either of those previously named, and bears carriage well.

Centennial Favorite—Too high praise can hardly be lavished upon this delicious fruit, or the habits of the vine as it *grows and fruits on my place* (in a sandy-loam soil); yet, since it has not received as many flattering notices by cultivators generally, I am led to suspect that my experience with it is an exceptional one. The fruit literally covers the ground, and is generally of large, and some of very large, size, as firm as the Charles Downing, and the most *delicious* fruit when eaten fresh from the vines, that I have tasted since the days of "Hooker." I dare only commend it for trial as a dessert fruit for family use, though it would not at all surprise me if it took a high rank for general cultivation on such soil as mine. I certainly cannot wonder that it took the highest premium at the American Centennial Exhibition.

Windsor Chief—Is doubtless known to many of you as one of the most immensely productive varieties of recent production, being probably surpassed only by Crescent. The vine has no faulty habit, though the blossoms are not fully self-fertilizing. The fruit is of good medium size, averaging as large as Wilson, not firm enough for shipment to distant markets, of an agreeable, rather acid (not rich), flavor, but with sugar and cream these berries will satisfy most palates. It

Digitized by Google

is an excellent sort to cultivate for near markets, but should have Charles Downing, or a similar sort, planted near it—one row to every two or three.

Crystal City—Is valuable on account of its extreme earliness, being a little in advance of any other sort in ripening. The vines are luxuriant and productive; the fruit medium in size, not firm and not rich; blossoms perfect.

Pioneer—This new and excellent variety does not, as yet, prove sufficiently productive on my grounds to warrant its extensive culture as a market fruit. The plant is moderately thrifty; the foliage is of a light green color, and, though apparently delicate, withstands extremes of weather remarkably well. The fruit is very beautiful, of large size, tender flesh, and of a delicate, agreeable flavor; blossoms perfect. The fruit is not firm enough to warrant growing it for distant markets.

Black Defiance—Planted on sandy land, was the admiration of all beholders, and especially of all tasters visiting my grounds last season, when the fruit was ripening on the vines. The vines are "stocky" growers, disinclined to form runners, but bear extraordinarily good crops—nearly half more than Wilson when this sort does its best; the fruit is large to very large, firm enough for shipment, and of a high, rich, sweet flavor; but, alas! its color prevents its ready sale in the market; it looks like stale Wilson fruit, which has stood in boxes four or five days. It was inquired for, however, in our home market by those who had previously bought and eaten it. But for this one objection, it would be most profitable to grow on sandy land as an early market variety. The flowers are perfect. My plants of this, of Miner, Cinderella, Continenal, Great American, Duchess, Durand's Beauty, and perhaps some others, were treated to weak liquid manure just previous to blossoming.

Springdale—Is a pistillate variety which is gaining in popularity generally with those who can sell large, fine berries for extra prices. One visitor to my grounds, in whose good taste and sound judgment I have much confidence, pronounced this the best sort on my grounds. I have fruited it fully but one season, the last, and, during the ripening of the first two pickings I was almost of the same opinion; but the berries did not hold out in size, as well as Cumberland and some others, appearing to be more affected by the extreme drouth which prevailed during almost the entire strawberry season. The fruit is

Digitized by Google

firm, of good, not high, flavor. I shall extend its cultivation somewhat. Capt. Jack is an excellent fertilizer for it.

Cumberland Triumph—Is probably better known to you than any of the foregoing; yet, as it is a comparatively new variety, it deserves a notice in this list. The plants are the perfection of vigor, the foliage large, heavy and quite persistent, the flowers perfect; the fruit is uniformly large, round, soft, holding its size to the very last pickings, and commands quick sales in home markets at the highest prices. The plants are moderately productive and blossoms self-fertilizing.

Duchess—Doubtless some of you have been listening for this name, as the variety is becoming deservedly popular, especially with those who grow a few berries for sale at home or in the near village market. It has done remarkably well on my grounds, and seems at home on *sandy* soil. The product is enormous, berries of fair, medium size and moderate firmness. The plants send out few runners, and are, therefore, of the easiest cultivation. This, like Crescent, Capt. Jack, Cumberland Triumph, and some others, kept in narrow strips, so occupies the ground along the strips that nearly the entire cultivation can be done by horse power—letting the implement run close to the vines at each cultivation, tearing out any runners which may have taken root outside the prescribed limits.

For fear of wearying your patience, I will mention but three or four more among the many other sorts which have fruited on my grounds.

Durand's Beauty (Essex) *as a berry* deserves all that can be said in its favor; it is large, of a peculiar conical shape, with a larger neck than the old "Neck Pine," brilliant rich red, as though varnished, and of a rich, though delicate and pleasing, flavor. The plants grow usually singly, and often stand several years without forming any runners, and are not productive on my grounds, though they have had extra care. The blossoms are perfect.

Sterling—Is a pistillate variety, of good growth and great productiveness, and the fruit of fine size and excellent quality; but the fruit-stalks are too short to keep the fruit from the ground, hence I will cast it out.

Forest Rose—Is another of the highly praised varieties, and when and where the vines escape the rust, it is truly meritorious; but this malady visits them so frequently as to render its extensive planting somewhat hazardous. The vines are good growers, full bearers, and the fruit above medium size, firm and of good quality.

Digitized by Google

Great American—Probably no variety yet introduced depends so much upon special treatment as this, and perhaps there is not another which will better repay for the care expended. One year since I would have sold out my plantation of this variety at less than half its cost; but, like a good horticulturist about whom we read, I persuaded myself to "let it alone this year also," and "dig about it," etc. I did so, and the result was as satisfactory as that of any labor ever expended in producing fruit, viz: a large crop of the most magnificent fruit ever seen of its species—in the *West* at least. They ripened after the general pickings of other sorts, the fruit—the largest of it—was from three to five inches in circumference, of firm texture, brilliant glossy red as though doubly varnished. The excitement over this fruit when going to market was quite amusing—one would-be-purchaser from Kentucky, offering three silver half-dollars for a single quart (which had been previously promised), to "take home to show our folks how strawberries *can* grow," as he said. The "special" treatment consisted in the application, two or three times in spring and during inflorescence, of a weak liquid manure, made by putting for each barrel capacity of the tank one barn-shovel of hen-manure, one of ashes, one-half of superphosphate and a quart of salt, letting it stand for twenty-four hours, and stirring two or three times, before applying. The tanks may be refilled once, and the second water will be about as rich as the first It is usually applied just before night to avoid evaporation. This really costs but little and *will pay an average of two hundred per cent* upon its cost.

Before leaving the subject of strawberries, allow me to say that beside the ordinary enriching of the ground with stable manure I apply each spring a compounded manure, well pulverized, similar to that used for making liquid manure, except that the proportion of hen-manure is two or three times as great as that of ashes, and plaster of paris and superphosphate is added, each about half the bulk of the ashes, with no increase in the proportion of salt. This is sown broad cast at the rate of six to ten bushels per acre (according to the quantity on hand), early in spring.

It is too early to report upon Glendale, Longfellow, Warren and others sent out for the first last year. I have them *on trial.* Let it be understood that this paper was to treat only of *new* varieties; and no inference should be drawn from it that such older well-tried and steadfast friends as Capt. Jack, Charles Downing and Kentucky are discarded by the writer.

Digitized by Google

THE NEW RASPBERRIES.

Improvement in the varieties of raspberries has not been so marked and valuable as has been that in strawberries during the last few years, yet a few among the many claimants to superlative merits are an advance upon varieties previously grown, in some important particulars.

I will notice a few of the many new sorts which have been tested on my grounds, without entering at all into details of cultivation. In fact the raspberry family requires no special fertilizers, neither is any one variety very discriminating in the nature of soil. Given good ground, sufficiently rich to raise fifty or sixty bushels of corn per acre, and good cultivation, and almost any of the varieties will do their best whether the soil be sand or clay. I will leave the subject of modes of pruning and cultivation to others.

RED RASPBERRIES.

Cuthbert—Probably deserves a place at the head of the list of red varieties, new or old, for general cultivation for market purposes. It has the virtues of hardiness, vigor and great productiveness of cane, combined with large size, firmness and attractive color and shape of fruit. Though not as delicious in flavor as our old friend, the Turner, yet, since it seems to equal that standard variety in hardiness of cane, and produces nearly or quite double the amount of fruit per acre, which can be shipped twice as far and keep twice as long after picking, its general superiority as a market sort is evident, The roots throw up suckers like the Turner though not so profusely.

Reliance—The good words spoken for the Cuthbert, above, will nearly all apply to the Reliance, as it produces enormous crops of berries somewhat larger than Turner, of higher flavor than the Cuthbert, but not as firm for shipping, though they are superior to Turners in this respect. The canes are quite hardy, and the variety produces suckers enough to furnish a good and sufficient reason for frequently running the plow between the rows during May and early June.

Winant—Is a competitor against the Cuthbert on the grounds of several raspberry growers, with the scales almost equally balanced between them. This also proves hardy here, very productive, fruit of good size, and firm enough to ship well. My preference is for the Cuthbert as grown side by side on my grounds, though had I but one. I might be quite confident that one was all which could be desired.

Thwack—Which many of you have probably fruited, is the hardiest

Digitized by Google

in cane of any variety on my grounds, and has some other points of decided merit. It is not a rampant grower like the Turner, growing usually only about four feet high, and hence not absolutely requiring to be pruned. It bears quite abundantly, the fruit is of good medium size, bright color, good quality, and ships much better than the Turner. It suckers quite as profusely as Turner. I think this sort "has come to stay," especially with those who are willing to give generous culture; for I noticed that where my men had carelessly left some small heaps of manure unspread along the rows the fruit was much larger than elsewhere.

Brandywine—Is comparatively new in the west, though it has been the standard market variety at the east, as the Turner has with us. This also has the merits of hardiness and productiveness, though the fruit is not as firm or of as good quality, with me, as the before-named sorts. I think, however, that for a market sort strictly it may be preferable to Turner.

Highland Hardy—Falls below the varieties named for general cultivation. Those who can procure them do not want this.

It may be expected that I will write of Henrietta and Queen of the Market; for surely one who is "proving all things" in the line of new fruits should have these! Both these so-called varieties are growing upon my grounds, but if the Queen is identical with Cuthbert, and Henrietta is identical with Belle de Fontenay (which I discarded fifteen years ago), why spend time in discussing them? If these are not thus identical, then some of our most careful observers who have the four "varieties" growing can no longer trust the evidence of their eyes and their palates; for correspondence with the most reliable of eastern growers fails to secure a single affirmation of the positive distinctness of either Queen or Henrietta. I have not yet fruited Henrietta, as the canes were nearly destroyed last winter; and my attention was not called to the identity of Cuthbert and Queen until after the fruiting season was over, and these two being far apart I did not compare them.

Early Prolific—Is decidedly too delicate in constitution for our rough western climate.

Pride-of-the-Hudson—Has a most aristocratic *name*, and hails from an aristocratic neighborhood. It is so exclusive in its habits that it never makes any advances toward its plebian neighbors—scarcely an offshoot appearing. There are a few stems stretching up each year, however, to make good the places of their progenitors which perished the previous winter! The fruit may be good which these lonely sentinels

Digitized by Google

would bear; but as they have never been taken to the cellar or root-house for winter quarters the most profound ignorance yet prevails throughout the Great West as to the proclaimed excellence of said fruit.

Requiescat in pace!

BLACK RASPBERRIES.

Gregg—Which originated in Ohio a few years since, seems destined to supplant the older late sorts. The canes are as hardy as those of any other, fully as productive as Cluster or Doolittle; the fruit is decidedly superior in color and flavor to the Mammoth Cluster, being destitute of the dull bloom which characterizes that variety, and is somewhat larger; the season is about the same.

Miller's Daily—Seems to be an acquisition to the earlier black-caps. The canes endured the trying ordeal of the winter of 1878–9 with less damage than those of Doolittle or Mammoth Cluster; they are rampant growers, very prolific, and the fruit, which ripens with Doolittle, is better than that standard sort—rivalling that superior old sort, the Seneca (which, by the way, stands next to the Gregg in its combination of merits).

HYBRID RASPBERRIES.

Concerning these there is little to be said.

New Rochelle—Is a *decided* acquisition to the list of varieties for the family fruit-garden. The canes bear immensely of fruit of the very largest size, and the best quality for cooking of any in the entire list—having that admirable mixture of sugar and acid which suits nearly all palates; the color of the fruit alone prevents it from taking the front rank as a market sort; the ground color is black, but is almost entirely covered with a clay-colored bloom, giving it the appearance of having been rolled, while damp, in road-dust.

Ganargua—Is also a clay-colored variety, not equal in size or quality to New Rochelle, though fully medium, and the canes bear profusely and are quite hardy.

YELLOW RASPBERRIES.

Caroline—Is on trial, but has not yet fruited.

Florence—Is hardy and prolific in cane, but the fruit second rate in quality. Its principal value is to mix—as the ladies delight to do—

Digitized by Google

with the bright red and black varieties, thus making a dish of beautiful dessert fruit.

The discussion following the reading of this report elicited but little if anything not included in the paper.

Report on utilizing fruits was now in order.

CANNING FRUITS AND VEGETABLES.

BY H. C. RAYMOND, COUNCIL BLUFFS.

As Iowa is just crossing the threshold of this industry and her citizens launching out on the great sea of competition in this important work, it is well to note in the annals our of society the small beginnings of what time will develop into one of the most beneficent and useful industries of our State; also to drop such hints by the wayside as may be of practical value to any one entering the business, whether it shall be the commercial canner or the mistress of the household. Within the lifetime of nearly all of us has this business grown from birth to strength of maturity, pressing on, seeking new fields to conquer, and as westward the star of empire takes its way, so the canning business, marching westward with sure and rapid strides, has already reached Iowa, stopped with us and is determined to grow up with the country.

I have endeavored to collect complete statistics of the canned products of Iowa put up by commercial canners during the year 1879; and when we consider that it is almost the initial step of the business in our State, the figures are creditable and prophetic of that progress for which Iowa is noted in many other departments of industry. The total number of cans of vegetables put up during 1879 was 633,900. Of this number over one-half were sweet corn, the balance largely tomatoes, with quite an amount of pumpkin, squash, sweet potatoes and beans. No fruit of consequence was canned, it being more valuable to sell fresh in the market. The quality of our canned goods is in all respects equal to those of eastern production. Seven different

Digitized by Google

firms or parties are now engaged in the business. The era of speedy fortune making in this industry has passed by. Competition is sharp, and the laws of trade and commerce too inexorable. Many financial wrecks have already disfigured this branch of trade; the field is fully occupied; the supply is equal to the demand. The rule of the survival of the fittest is applicable to this business, and while some will fail others will be ready to fill the vacancies. We have plenty of doctors and a surfeit of lawyers, yet there is always room for one more who is pre-eminently fitted for his profession. So, too, the commercial canner will succeed in the same degree as he possesses the necessary qualifications. These are: a practical knowledge of the operations of canning in its various branches; a capital of $25,000 and upwards (not borrowed money); a man content with moderate dividends, locating his business where the soil and climate are favorable to the cheap production of these varieties of fruit or vegetables that he proposes to utilize—an energetic, shrewd business man. Such an one will succeed; all others will fail. When the dividend on capital invested amounts to no more than one cent per can, which is considered a fair return in these days of close competition, there must of necessity be very correct business calculations. We often hear unreasonable people say "there is no such thing as over-production," or that "Iowa canned fruits and vegetables will soon drive all others from Iowa markets." Such self-taught economists are wise only in their own conceit.

While our observations and experience teach us that our soil and climate is especially adapted to the production of certain varieties of fruits and vegetables, we must admit that other portions of our favored land are better suited to growing certain other varieties; and it is well to note here that, as a rule, in whatever part of the country any variety of fruit or vegetables can be grown the cheapest, there it will be canned, for, as a rule, wherever a certain article can be grown cheapest, that locality is especially adapted by its soil and climatic influences to bring an annual crop to perfection. Cheapness and fine quality are the two first requisites to success in the canning business. No member of this society would seriously contemplate the canning of Iowa peaches to compete with the Baltimore product. Neither will the sensible canner of Maine deem it wise to send his sweet corn to Iowa, the greatest natural corn-field in the world. Already are the canned goods of California's fruitful valleys sweeping down upon us, traveling one, two, three and four thousand miles seeking a market.

Digitized by Google

We notice they do not carry coals to Newcastle by sending us sweet corn and tomatoes; let us imitate their example by sending to Baltimore our canned corn, receiving in return her peaches.

Another branch of this industry, and of immediate interest to almost every housekeeper, is the canning of fruits and vegetables in the household, quite often the surplus product of our own gardens. A few suggestions as to cans, methods and principles involved may be of value at least to the beginner. Glass jars are much used, and would be the best and cheapest in the end were it not for the great liability to breakage, and of late years the competition among glass jar manufacturers has had the effect to render many of the jars very imperfect. The glass jar is desirable for the reason that the fruit and vegetable acids do not act upon it. It is objectionable because of liability to breakage, imperfect manufacture, and from the fact that its transparency renders the contents liable to damage by the chemical action of light. To prevent loss from this last mentioned cause the jar must be placed in a dark closet, or well wrapped in material that will exclude the light. The tin can seems at the present time to combine more qualifications than any other receptacle, yet far from perfect. Various fruit and vegetable acids act upon it to a limited extent. I think that any articles containing oxalic or acetic acid, such as rhubarb and pickles, should not under any circumstances be canned in tin. A practical and useful field is open to inventors for the furnishing of a cheap and superior receptacle for canned goods. It seems to the consumer unfortunate that he has to pay one-fifth to one-half the cost of the canned goods for the can that is worse than useless, as the rapid accumulation is already clogging the highways, filling the by-ways and disfiguring the hedges, but we must remember that these cans represent the labor of many thousands of working men, and we are not throwing away our money when we cast the empty vessel aside.

In sealing tin cans, soldering is the principal and only sure way, but putty or wax composed of resin and tallow is generally used in domestic canning, because more easily removed. If the can is cleaned and dried immediately after opening, it can be used a second or third time. The principle that insures success in canning is that the article to be canned should be heated thoroughly to the boiling point, placed in cans and immediately sealed. The object of heating is to expel the greater part of the air by rarefaction. Fruit may be placed in the cans or jars and cooked in them, care being taken to leave a small vent for the heated air until ready to seal. When fruit is placed in cans

Digitized by Google

before cooking, a weak syrup of sugar and water is used to fill the air spaces. Condensation of the air in the can by cooling after being sealed causes the contents to settle, thus when we open a can we do not find it full, unless the pressure of the outside atmosphere has indented the can and filled the so-called vacuum. If glass jars are used the best plan to prevent breakage while filling, is to gradually heat the jars in water or in the oven until they are nearly as hot as the material to be used in filling. Only perfectly sound fruit or vegetables should be used, as if decay has commenced it may cause great loss. The most careful manipulation will not insure complete success, because imperfections in jars or cans are sometimes so minute as to escape detection. I think that no sugar should be used in domestic canning; it does not help to preserve the fruit.

The natural flavor of fruit or vegetables, when grown under favorable conditions and properly canned at the right time, cannot be improved. When prepared for the table they may seasoned to suit the varied tastes. Some fruits develop sugar after being canned, and though tasting very sour when canned, are found quite palatable when opened for use. In conclusion I will say that our duty and interest as fruit-growers is to encourage this young industry, that as the years roll on and Iowa becomes the foremost fruit-producing State in the Union, we may have a home market for our surplus products.

DISCUSSION ON REPORT.

Question: Please tell us how to successfully put up sweet corn and string beans for home use.

Mr. Raymond: I cannot tell you this, as I do not know. This kind of work is mainly done at the large canning factories, under the charge of experts, who claim and seem to possess some secrets of the trade. Mr. Kemble is with us, and I hope he will give us such items as his long experience qualifies him to give.

Mr. Kemble: I truly have had some experience in Iowa canning of fruit and vegetables, but it is difficult to give off-hand, or even on paper, any specific items as to the minutiæ of the work. There is nothing mysterious in the work, yet it has many details which in all their relations can only be learned in actual practice. The first lot of corn I ever put up was an unqualified success, and I was elated thereby. But my second, third, and fourth lots, were as positively failures. It cost me fully two thousand dollars to learn how to can corn, and I

Digitized by Google

have some things yet to learn, more especially as to the influence of the weather on our relative degrees of success. To-day the corn may be just right to insure success in canning; to-morrow a new phase of weather may make it next to impossible to successfully perform the work, so as to give satisfaction in the market. When fruit men know all about the causes of blight, *then* will those engaged in canning know all about the variations and the chemical changes wrought by the weather in the corn at the stage of growth proper for canning. There is a mania now about canning of fruits and vegetables. This is all right, if the mania takes organized and intelligent form. But the average man who goes headlong into the work, can lose what he has about as suddenly as in any other branch of which he knew little or nothing. The demand for canned goods is enormously on the increase, but to produce merchantable goods in competition with the systematized establishments, it is imperative that companies be formed as in the manufacture of woolen and cotton goods, wagons, etc. With a business less than half a million cans a year it will be difficult to make the work really pay at present prices. If we have first class facilities, we produce first class goods. This is what we now most need to keep up the reputation of our prairie brands. It is so precisely with our newly developed butter interest.

Over 4,000,000 cases of canned goods are now put up in the United States annually, and the demand is constantly increasing.

At Elgin, Ill., the produce from about 900 acres is annually put up, and already the Marshalltown factory, of our State, uses the product of 300 acres. Our western goods now stand highest in the markets, and we should labor to maintain our position. The making of apple jells gives promise of great results in the near future. Our exports of canned goods now amount to 25,000 cases per week. Three years ago the exports averaged less than 500 cases per week.

Stowell's Evergreen is the best variety of corn we have yet tried. An acre will fill about 900 cans, for which we pay two cents per can. The canning season of corn is short, and we try to extend it by varying time of planting. We put up asparagus, beans, beets, squashes, and pumpkins. We cannot retain the natural flavor of strawberries as well as raspberries; but the small fruits we can at the west are far better than those put up at the east, as the stale fruits of the commission men are there mainly utilized after all hope of selling them in fresh state is past. In large cities even the refuse stuff, *condemned by the board of health,* is used up in the way of shoddy canned goods.

Digitized by Google

Another kind of work casts discredit on the business. This is the canning of thousands of bushels of *dry peas* from Canada.

Mr. Lathrop: Some of our ladies have canned corn and tomatoes together. For some reason this mixture keeps perfectly, and the dish is well liked by many.

Mr. Calkins: In our section some canning of corn for home use is done by fumigating slightly with sulphur. The slight acidity is removed at time of using by the use of a small quantity of soda.

REPORT OF DIRECTOR OF THE SEVENTH DISTRICT.

BY HON. GEO. H. WRIGHT, SIOUX CITY.

Mr. President and fellow members—Another year of labor, of trials, of disappointments and of success, and what has it profited us? The seventh district is among the new and sparsely settled portions of the State, and as yet but little has been accomplished in fruit growing, but enough has been done, and enough accomplished, to satisfy the skeptical that fruit may be grown in any, and all, of the counties of the State, and successfully grown at that.

The winter 1878–9, was favorable for orchards, and a fair promise for a good fruit crop for the district existed. A heavy frost on the 6th of May cut off the entire crop of apples in the northwest portion of the district, and injured the crop in all the balance, yet there were more varieties of the apple exhibited at the county fairs than in previous years.

In Sac county there were thirty varieties of apples on exhibition grown in the county, consisting in part of Benoni, Sweet June, Red June, Tetofsky, Oldenburg, Red Astrachan, Fameuse, Gros Pomier, Saxton, Maiden's Blush, Fall Pennock, Autumn Strawberry, Ben Davis, Rawles' Janet, Jonathan, Seek-no-further, Dominie, Willow, and Talman Sweet.

From this list you can see that a large number of varieties may be grown here with greater or less success.

Digitized by Google

I am indebted to Mr. Washington Allen, of Sac City, for the above notes. He farther says, that the Early Richmond cherry does well with him, also. The Concord grape is about the only variety cultivated, and it pays well for the labor expended. The Mammoth Cluster raspberry, Red and White Dutch currant, and Wilson strawberry pay well. Mr. Allen further states, that the only insects detrimental to the progress of fruit growing are of two species. The leading one is the oily tongued tree swindler, usually making his appearance about the first of June, and remaining from one to two months. He sometimes makes his appearance in the winter for a short time the next season after. We have often been visited by this pest. The best remedy is the shot-gun policy.

The second pest is the Tent caterpillar, which is much easier to dispose of. With a stick they are easily wound up in their nest while small, and then crushed with the foot.

If we could get rid of the first named moth as easily, Sac county would soon be in a flourishing condition horticulturally.

At the Monona county fair there were the past autumn eighty entries of fruit. I have the following from Mr. McWilliams, of Onawa:

I have obtained what information I could in regard to the varieties of the apple bearing in this county. Of summer sorts we have Tetofsky, Red Astrachan, Oldenburg, Sops of Wine, Red June, Early Harvest, Kirkbridge White. Our fall varieties fruiting are: Fall Winesap, Lowell, Fall Orange, Cole's Quince, Utter's Red, Fameuse, Golden Pippin, Glory Mundi, Pumpkin Sweet, Sweet Pear, Harber Sweet, Blackburn's Superior, Detroit Red, Whiting Seedling, Keswick Codlin, Fall Juneating. Winter varieties are: Jonathan, Willow, Rawles' Janet, Ben Davis, Dominie, Wagoner, Perry Russet, Golden Russet, Romanite, Hewes Cider, Winter Rambo, Talman Sweet, Bailey Sweet, Yellow Bellflower, Red Winter, Illinois Spitzenburg, Vandevere Pippin.

The above mentioned are those bearing some fruit. There are many more kinds not yet fruiting. The best varieties are Jonathan, Utter, Red June, Oldenbury, Whiting, Winter Rambo, Ben Davis, and Fall Janet. Mr. Everts has the largest orchard, which contains eighty acres, of which eight hundred trees are in bearing. Judge Whiting has the next largest, about forty acres, nearly all in bearing.

The season was unusually dry, which injured the strawberry crop; otherwise the crop was good. The Wilson and Green Prolific planted together gave me better satisfaction than when planted in separate rows alternating the varieties.

The Miner, Forest Garden, and Weaver plums are entirely hardy and

Digitized by Google

productive. The Curculio is the great pest of this fruit, but may be successfully met and conquered by the plan of fumigating with gas tar.

Salt on strawberry ground is a good thing, as it kills all grubs and worms, and is a good fertilizer, but I say it is injurious to the plants when sown broadcast so that it falls on, and remains on, the plants. Two years ago I applied it to the ground between the rows with good results. This year I sowed it broadcast over the bed and the result was that it seared the leaves and dried up the fruit whenever it came in contact with it.

The grasshopper has been our great enemy here. This year the loss from this insect has been enormous. But we feel as though we had seen the last of the hoppers, as for the past five years they have been contracting their limits, and now I feel sanguine they have entirely left our beautiful northwest.

Cherries were about one-fourth of a crop owing to frost in May. The Early Richmond is about the only variety in bearing. There are some Late Richmond in bearing. They mature later in the season and the fruit is smaller.

Currants do not bear as well here as on a clay subsoil or on a sandy soil.

Blight has made its appearance in the northern part of the District to some extent. Wherever I have seen it, it is mainly confined to trees so located as to get more of the sun's heat than in other portions of the orchard. The varieties most affected are the Transcendant, and Red and Yellow crabs. I respectfully submit a communication from Washington Allen, of Sac City, which treats of the bright. It is a valuable paper from an observing man.

Hedging is not progressing much. The cheap fence now made with barbed wire has to a great extent lessened our former interest in attempts to grow live fences. But this lack of interest should not continue. The Honey locust is entirely hardy with me. I have a hedge now seven years old running through the center of a field, on the open high rolling prairie, and it has not been injured by our test winters.

Forest tree planting goes forward with unsurpassed vigor and confidence. Where but a few years ago not a tree could be seen, now magnificent groves dot the country over. Millions of trees are being planted every year. I would only give a word of advice to those who are planting groves: Plant less cottonwood and more box-elder, ash, walnut, oaks, and the more valuable varieties of timber trees.

Digitized by Google

SAC CITY, December 29, 1879.

HON. GEO. H. WRIGHT—*My Dear Sir*—Yours of the 21st inst., is at hand, asking my opinion as to the causes of the blight. I will freely give the conclusions which result from my experience and observation as plainly as I can. I have watched the progress of this trouble for several years, but within the past two years I have made it a special study. The result is, I have concluded that, beyond a reasonable doubt, it is nothing more nor less than sun-scald, *or the effects of too intense heat.* I do do not claim this idea to be original. It has been talked of, written about, and often discarded. It is argued that blight cannot be the result of excessive heat, as in this case, the effects would be more general. In other words, the whole tree, or a whole row of trees, would be affected rather than a single tree, a single limb or twig, or even a single leaf. This conclusion is by no means sound. Even the frost is by no means general in its effects. The little patches, the single vine, the single branch or leaf, are destroyed where the cold is not severe enough for total destruction. If the heat was sufficiently intense a general destruction would ensue with trees and plants. With a less intense heat, the plants, and parts of the plant least able to endure the temperature will be specially affected. I had, in my old orchard, a hardy seedling which I top-worked with Tetofsky. The scions grew nicely, but when the hot weather came on, I noticed some blight on these rapid-growing shoots. I at once cut back the affected shoots, which seemed to stop it that season. Last summer, on an intensely hot, still, day, I thought of my pet Tetofsky, and went to it about four o'clock, P. M. It was in a deplorable condition. The leaves on all the vigorous shoots were wilted as though nipped by frost. The English Golden Russet in the same row was similarly affected. This row of trees stands on the north side of a high corn-crib, and what little air was stirring that day, was in the south. The special position that day of this row made it the hottest place in the orchard, and no other trees were affected in this way. I cannot report all my reasons for the general conclusion that heat is the main cause of much of our trouble with our fruit trees.

Mr. Raymond, of Council Bluffs, in the Horticultural Report for 1877, says that blight is a sad drawback with him. He seems to take little stock in the theory that soil-shading will lessen the trouble. But he believes that if we had no spells of warm sultry weather just after a rain, we would have no blight. I agree with him in this. But Mr. Raymond cannot see how Dr. Hull's plan of root-pruning can save our trees from blight. I can readily see how this may be. The root-pruning induces slower growth, less tender foliage and new wood, than where the growth is rapid and succulent.

In the same report, Mr. J. S. Stickney, of Wisconsin, says, that since the pear trees are getting scarce, the blight amuses itself mainly with the crab apples standing in warm and sheltered spots, while those in exposed positions, and not well cared for, were exempt. All our experience, if we carefully review it, tends to strengthen my belief that a rapid, tender growth about the time of our first intense heats of summer, is a main cause of blight. Of course varieties differ as to their liability to be affected by in-

Digitized by Google

tense heat when in this condition. The best preventatives I know are to set the orchard where it may have a free circulation of air, do but little pruning, and cut back the new growth as soon as you note the appearance of the disease. Looking for more light on this subject, I remain,

Yours, WASHINGTON ALLEN.

DISCUSSION ON REPORT.

Mr. Kellar: I have tried the salt to some extent. Last spring, before the leaves expanded, I sowed three bushels of salt per acre on one patch of strawberries, and at the rate of one bushel of lime per acre on another patch. On both salted and and limed portions of the bed I got fair crops, and the balance of the beds were a failure.

Mr. Rambach: I have had considerable trouble with the grubs. I tried an experiment which seemed to work well. I spread a heavy coat of straw over a plat I wished to plant with strawberies, and set fire to it. I did this when the ground was ready for planting. It seemed to kill all the grubs. On this ground I had a fine crop.

On motion, Society adjourned to meet at two o'clock, P. M.

Digitized by Google

WEDNESDAY AFTERNOON SESSION.

Society met pursuant to adjournment.

President Watrous very agreeably surprised the meeting by the following announcement:

"*Gentlemen of the Horticultural Society*—We have with us one who needs no introduction from me, for you know him better than you know me. I have the pleasure to present the people's Governor, John H. Gear."

The Governor was greeted with applause, and in a brief and impromptu speech he reviewed the progress of horticulture since the organization of the Society.

Substantially he said: "I am forcibly reminded by the exhibit of perfect, high-colored fruit in this room of the rapid advances which have been made under the fostering influences of this Society in tree and fruit growing on our great prairies. I well remember the first load of home grown fruits exhibited on the streets of Burlington. The people gathered around in seeming doubt as to the truth of the story that it had really been grown in Iowa. I also well remember the expressed astonishment of Mr. Ellswanger thirty years ago, when he beheld for the first time an exhibit of the fruits of our early orchards at a meeting of the old Northwest Fruit Growers' Association. Since then we have repeatedly astonished the eastern experts in pomology by exhibits of our fruits, carrying off the highest honors and awards in competition with the best products of the States east of us. The untiring efforts of your useful organization to secure the best fruits from every land with similar climatic and soil conditions give flattering promise of still more encouraging results in the near future.

"Your labors in the good work of dotting our prairies with groves and shelter belts are already more than realizing my expectations when I had the pleasure of aiding in the passage of the act by which your Society is endowed with a small annual appropriation. We can entertain no doubt relative to the final amelioration of our climate by the vigorous prosecution of this work of extended timber planting. I am not an expert in these things, but I have faith in the good time coming when our home grown timber will not only modify our climate, and shelter our prairie homes, but furnish an ample supply of timber for economic farm uses, and manufacturing purposes.

Digitized by Google

"I need not say that I am in hearty sympathy with the noble work you are prosecuting with such discretion and unitedness of effort."

Mr. Calkins now announced that this was the birthday of one of our pioneers in prairie agriculture and horticulture. In token of respect I move that Hon. C. F. Clarkson be made an honorary life member of this Society.

Hon. A. S. Welch: I heartily concur in this motion. During the many years of Mr. Clarkson's labors for the advancement of all industrial interests in the west, his special interest in the work in which this Society is engaged has ever been manifest in the surroundings of his prairie home, and in his private and public teachings.

Motion unanimously carried.

Col. Scott: It is just that a good and popular movement of this kind should be followed by another. Hon. John H. Gear has richly earned a similar honor from the hands of this Society. As Speaker of the House he left his seat to make a speech in favor of the small endowment fund which now enables this Society to carry on its noble work. The clause in our endowment act relative to Forestry encouragement was placed there by his motion. I move that he be made an honorary life member of this Society.

Motion sustained and unanimously carried.

On motion, Hon. A. S. Welch by unanimous vote was made an honorary life member of this Society.

The committee on the adoption of rules to govern the exhibit of fruits was now ready to report. Col. Brackett reported in favor of the rules adopted by the Ohio Society with the addition that five hundred slips of the same be published by the Secretary for the use of officers and committees.

Report adopted.

The rules will be found on preliminary pages of this report.

Digitized by Google

REPORT OF THE DIRECTOR OF THE SIXTH DISTRICT.

BY HON. B. F. GUE, DES MOINES.

The sixth district embraces the counties of Story, Boone, Greene, Polk, Dallas, Guthrie, Madison, and Adair.

There has been for many years in this section of the State an increasing interest in fruit growing, as well as in ornamental and forest tree planting. We have passed beyond the period of doubt, as hundreds of thrifty, productive young orchards now establish the fact that the larger portion of this district is well adapted to fruit raising. Apples, cherries, grapes, and almost all kinds of small fruits are grown of excellent quality and in great abundance where orchards and vineyards have been intelligently planted and properly cared for. Evergreens have been sold at low prices for several years, and thousands of farmers have beautified their homes with pines, spruce, and cedar.

In years past Osage Orange has been quite largely planted in the southern counties of the district, and where skillfully managed has often made a good live fence. In the northern counties willow has been more generally planted. It makes a very rapid growth, furnishing, in a few years, protection from the fierce winter winds, and supplying fuel in great abundance. But as a fence, the broad spreading willow hedge-row is not growing in popularity.

Since the introduction of barbed wire all other styles of fencing are giving way to this cheap, safe, and easily constructed "fortification," that unsound law and expensive custom require the owner of a home to erect around his premises before he can be secure in the possession of his property. As a large part of this district has a fair supply of native timber, and an abundance of fuel in its immense coal fields, less attention has been given to forest tree planting on a large scale than in the northern and western counties.

I submit the following statements of interesting facts and opinions contributed by some of the largest fruit growers in several of the counties of the district.

Digitized by Google

DALLAS COUNTY.

B. F. Greene, an experienced fruit-grower and nurseryman near Adel, in Dallas county, on a prairie soil, somewhat sandy, gives the result of his observations as follows:

The varieties of apples which have succeeded best in this locality are:

Summer apples—Red Astrachan, very reliable biennially. Red June, a great bearer; the fruit often scabs; needs severe thinning out, both of limbs and fruit. Williams' Favorite, fruit large, very fair, and good, but not a plentiful bearer annually; tree almost perfect. Duchess, Benoni, and Early Pennock do well.

Fall apples—Cole's Quince, Lowell, Maiden's Blush, Dyer, Fulton, and Porter all succeed well.

Winter apples—The Jonathan stands at the head. Ben Davis the best bearer and "salable." Rawle's Janet, good bearer, but fruit often small. Willow Twig and Canada Red good bearers. Would plant Spitzenburg and Rhode Island Greening top-grafted on hardy stocks. White Bellflower, equal to the Greening in quality, a good bearer, but not quite as hardy.

Would prefer root-grafting to top-grafting, excepting for a few kinds of fine fruit of tender varieties.

Plums—Have not succeeded. We have little to show for much money expended.

Cherries—The Early Richmond cherry is the only kind that has been successful.

Pears—Nearly all gone with blight.

Grapes—Of grapes the Concord is the grape for the "million." Have spent much time and money on some thirty other varieties, and have nothing to show for it worth naming.

Strawberries—The Downer is among strawberries about what the Jonathan is among apples. It will take care of itself when fairly started, and unless overrun with grass will produce good crops of fine fruit.

Blackberries—Are a failure. The bushes have been a nuisance on my place for twenty years.

I find that most kinds of fruit do better on the clay ridges and thin gravelly soil than on our deep, rich, black prairie soil.

J. D. Whitman, who has a large orchard near Dallas Center, regards

Digitized by Google

the Jonathan, White Winter Pearmain, and Willow Twig as the three best winter varieties.

Fall apples—The Lowell, Dyer, and Early Pennock do best. Some seasons the Pearmain has produced four times as much as any of the others. It is liable to be scabby, however, but on the whole has been with me the most profitable variety. Soil, a rich black loam, on high rolling prairie.

I find that apples left in piles under the trees, shaded from the sun, were but little affected by the extreme hot weather of last fall, while those put in a building, though well ventilated, soon began to decay.

ADAIR COUNTY.

Jacob Bruce, of Holidays, Adair county, who has had more than twenty years experience in fruit-growing, gives the following items of interest:

Pears and plums do not succeed here; after a few years rapid growth the trees generally blight.

Cherry trees grow large and thrifty, but, after twenty years trial, I have not got enough fruit from them for home use.

All small fruit (excepting grapes) failed the past season in this vicinity, killed by heavy late frosts.

The varieties of apples that succeed best in this locality are:

Summer apples—Early Harvest, Red Astrachan, and Red June.

Fall apples—Maiden's Blush, Benoni, Rambo, Dyer, and Westfield's Seek-no-further.

Winter apples—Jonathan, Winesap, Jenneting, Peck's Pleasant, and Belmont.

All of these are good bearers. Our soil is a black loam about four feet deep.

I prefer top-grafted trees; my experience is, that they come into bearing earlier, the trees appear to be more hardy and longer-lived, than those root-grafted.

STORY COUNTY.

A. J. Graves, of Ames, Story county, whose orchard is on high rolling prairie, with northern exposure, soil sandy loam, gives the following items of interest:

The three varieties producing uniformly the largest crops of apples are the Ben Davis, Fameuse, and Duchess. Thinks the flavor of the

Digitized by Google

Ben Davis is improved when grown on light sandy soil. The Jonathan, Willow Twig, Dyer, Red June, and Benoni, do well.

The Early Richmond and English Morello cherries succeed here.

The Lombard, Miner, and Weaver plums, have been extensively planted, but produce very little fruit.

Of pears, the Flemish Beauty does well, making a good tree, and so far not subject to blight.

POLK COUNTY.

I examined one of the oldest orchards in this locality in September last, which was planted thirty-one years ago. The trees were set thirty feet apart; they were grafted in the tops; had been trimmed up high, so that the lower limbs were above a man's head, extending out from the body, forming broad spreading tops that shaded the entire surface of the ground. They were perfect specimens of sound, healthy, vigorous growing trees, well loaded with fine fruit, with no indication of decay, but seemed likely to live to as great an age as any trees I ever saw in New York or Michigan. This orchard stands on high, dry, rolling prairie, and has no protection from timber. Its condition of vigor, and promise of endurance for another generation, indicates that orchards may be raised on the open prairies of Iowa, that will equal in productiveness and longevity the best eastern orchards. It also shows that close planting should be abandoned, and an area of at least thirty feet given to each tree. Most of the orchards in this part of the State are planted too close, the trees in many cases meeting long before they have attained full growth.

Al. Swalm, of the "Penrose Fruit Farm," writes: "The varieties giving the best and largest crop of fruit the past year, were Jonathan, Winesap, Fameuse, Lowell, Ben Davis, Red June, Dyer, and Willow Twig. Would regard the Lowell, Jonathan, and Willow Twig, the three most profitable varieties.

"This market is overstocked with early apples, and as they will not bear shipment well, the price ranges very low. My trees are all root-grafted, and soil black loam."

The unusual high temperature that prevailed during the greater part of the month of September ripened winter apples uncommonly early, and the heat continuing late into October, caused rapid decay and great loss of winter fruit.

Jonathans were generally gone by the middle of December, and the

Digitized by Google

Ben Davis, Winesap, and Rawle's Janet, were ripe and beginning to decay fully a month earlier than usual; the Willow Twig seems to be keeping best of any variety.

The crop of cherries was generally light, the demand far exceeding the supply. Early Richmond and English Morellos sold readily at from $2.50 to $3.00 per bushel.

There was a large crop of Concord grapes, of excellent quality; other varieties as usual making but a light yield.

In the vicinity of Des Moines the strawberry crop was very large, of fine quality, and the season unusually long.

Raspberries and currants gave very light crops. The raspberry canes were badly damaged by the severe cold of last winter, and the dry weather of midsummer cut the crop short.

Plums, as usual, were mostly destroyed by the curculio.

Pear trees that have escaped blight, gave a fair yield of fruit of excellent quality.

It is estimated that Polk county produces annually about 80,000 bushels of apples, and other counties of the district are year by year rapidly increasing the yield from young orchards just beginning to bear; still the supply is far below the demand for home consumption.

In Des Moines alone, I learn from careful inquiry among the fruit-dealers, more than 25,000 barrels of winter apples are annually imported from other States to supply the demand made upon this market. The average cost to the dealer of first-class winter apples delivered here, is about $2.25 per barrel, showing that more than $56,000 are annually sent out of the State by Des Moines alone, for one class of fruit that can be successfully grown upon every farm in the district at a large profit.

On the basis of the moderate estimate that Des Moines imports one-twentieth of the apples brought into the State, we find that Iowa is paying out annually to Illinois, Missouri, Michigan and Ohio more than $1,100,000 for winter apples, making no account of large additional amounts sent out for dried and canned fruits, cider and vinegar, which can be produced as cheaply here as in any State of the Union.

Our legislature has by exemption from taxes, done much to encourage orchard planting, and this Society has by its discussions, and collection and publication annually of facts drawn from the experience of our most enterprising and successful fruit-growers, done much more in the good work; and with the same liberal policy continued we may hope to be able in the near future to stop this heavy drain upon our

Digitized by Google

wealth, and see transferred to our own citizens the profits that now go out to fruit-growers of other States.

This Society can do much to stimulate orchard planting, by a careful collection of facts bearing on the best methods of propagating trees of different varieties.

Years of experience have demonstrated that many varieties of apples succeed root-grafted, while others equally desirable are almost worthless when grafted on pieces of roots.

I believe it is now generally conceded that such choice varieties as the Early Harvest, Yellow Bellflower, Rambo, Northern Spy, Rhode Island Greening, and many other desirable sorts, are not generally successful root-grafted, while the Dyer, Maiden's Blush, Jonathan, Ben Davis, Grimes' Golden, and Willow Twig, are not hardy enough to propagate by root-grafting in the northern counties of the State, and suffer from the coldest winters in the central counties.

We cannot afford to plant half-hardy trees—wait years for fruit, and when the "Arctic" winters come along, see them destroyed. Neither can we afford to abandon the choice varieties that are not "iron-clads." We have the Duchess, Red Astrachan, Fameuse, Wealthy, Walbridge, Gros Pomier, and a few other varieties that appear to be able to withstand the extreme changes of our trying climate. But this list excludes all of the old choice varieties—and how to produce a tree hardy, healthy, and long lived, that will give us the superb Jonathan, Grimes' Golden, Dyer, Early Harvest, and Rhode Island Greening, or their equals in quality, is one of the problems that fruit-growers of the northwest are trying to solve.

All are watching with deep interest the experiments now being made at the Agricultural College, under the direction of the Professor of Horticulture, in importing and testing hundreds of varieties from Russia and Northern Europe. These experiments can hardly fail to give us several valuable new winter apples adapted to our climate and soil, some of which may be of excellent quality. But while we are waiting the results of this good work, we need not abandon the idea of producing a tree that will withstand the rigors of our trying climate, and give us the identical Jonathan, Greening, Grimes' Golden, and Dyer in any part of the State.

When fruit-growers learn to discriminate, and are willing to pay a liberal price for the best bred trees, as the intelligent stock-grower is willing to pay a higher price for the thoroughbred animal, than

Digitized by Google

for the ordinary scrub—then nurserymen will propagate the choice varieties that do not succeed root-grafted, by top-working on hardy stocks. We know by experience that the Gros Pomier grafted on a thrifty seedling-root at the crown, given plenty of room in the nursery row, good cultivation, and a little pruning, will in eighteen months make a tree from six to seven feet in height, a straight symmetrical body, with plenty of good roots, and hardy as an oak. By grafting all of the desirable varieties that are not strictly "iron-clad" on such stock as this, three or four feet from the ground, we secure a reliable root and body—and as the branches are not liable to serious injury from the extremes of heat and cold, we have by this method produced trees that should equal in endurance, productiveness, longevity and quality—the best old orchards of New York or Michican. I am aware that the impression generally prevails, that on our rich prairie soil, and in a climate subject to sudden and great extremes of heat and cold, orchards will generally prove shorter lived than in the Eastern States.

I cannot regard this theory as yet established. It is undoubtedly true as to the past—but will it be in the future?

When it is remembered that a part of the generation is still living that planted the first orchards in Iowa; and we note the great progress that has already been made in determining which varieties of trees are adapted to our soil and climate; and reflect that thousands of the most intelligent fruit-growers and nurserymen are earnestly engaged in investigating the causes of failures of the past, and closely observing the habits and peculiarities of the most promising varieties; are yearly experimenting in new methods of propagation and treatment, collecting and testing foreign trees and seedlings, I think we may reasonably expect that before the present generation passes away to have attained such an accumulation of knowledge and experience, as will enable us to produce apple trees that will equal in quality of fruit, early bearing, productiveness and long life the average of the orchards, of what are now known as the "fruit-growing States" of the East.

DISCUSSION ON REPORT.

H. W. Lathrop: We should not go to extremes on any division of our extended work. Top-working may be a good thing, but we should be careful about assuming that all our half hardy varieties may be grown top-worked on hardy stocks. I have had some experience

Digitized by Google

hardly favoring such an opinion. In 1865 I put out an orchard of hardy trees as stocks, mainly on which to work Dominie, Janet, Jonathan, Rhode Island Greening, etc. I top-grafted in the body as recommended now. The result is that where I top-worked with hardy sorts, the tops are sound. Where I top-worked with varieties likely to fail in the forks, the top-working has not saved them from this trouble. I have learned a lesson from this. Instead of top-working half-hardy sorts in the main stem, I would now put them on the diverging limbs, so that the main forks or branches may be of the iron-clad sort. In our early experience in new fields of experimentation, we are too apt to assume a belief to be a fact. Our older growers well know that a failure in the forks of the main branches is a more serious trouble in our orchards than sun-scald of trunks, about which so much has been here said in connection with high stems.

Mr. Case: This idea of grafting in branches rather than in the main stem of trees while yet small, seems to include the one of putting scions in large limbs. This kind of grafting succeeds well at the east, but in this climate I have rarely had satisfactory success in the cleft-grafting of large limbs.

Mr. Lathrop: I did not mean this. The trees should be grafted as soon as the limbs diverging from the main stem are large enough. I have not had good success here in grafting large limbs.

Mr. Bacon, Harrison county: I wish to state that in our county we have some trees of Baldwin apple that have been in orchard from 15 to 17 years. Is this exceptional? I do not hear that it is a favorite in this State.

J. L. Budd: Such exceptional cases do not prove much relative to any variety. I know some old trees of Rhode Island Greening, in Benton county, which have borne good crops for many years. Yet all attempts to get other trees through their first years in orchard, or nursery have failed. In northern Ontario, Canada, are reported some very old pear trees of a variety now difficult to start in that section.

Mr. Stanton, Des Moines: I have three trees of Baldwin top-worked on hardy seedlings. They prove very profitable. I wish I had many more. These trees are now twenty-three years old.

A member from Warren county, reported some Baldwin trees looking well and bearing well.

Mr. Raymond: An idea is hinted at in the report about fortifications around orchards to keep out stock. This relic of barbarism

Digitized by Google

should be done away with on our prairies. Nebraska is setting us a good example in the way of restraining stock, rather than barricading our gardens, orchards, and cultivated fields. Our Society can prove a power in the land in this great work for the mutual interests of all land-owners.

Mr. Hargis, Des Moines: I wish to say a few words on general orchard experience. I have started three orchards. The first one had protection on the north and west by a locust grove. The borer finally got in the grove, and it was cut away. After this the orchard was quite badly injured. Another orchard had no protection, and had a slope of ground to the north. This orchard has done best of all. Our climate seems to be improving. Varieties which in the early days seemed too tender, now do well. On the other hand, the wild fruits doing so well in those days are now running out. Timothy and clover were difficult to get started when our country was new. Now they come in everywhere. Duchess, Lowell, Early Pennock, Dyer, Cole's Quince, Fulton, Fameuse, Rambo, Winesap, and White Winter Pearmain, have paid well. Jonathan and Willow have been very profitable. Winesap has done well in one of my orchards on rolling prairie, but very poorly in another on hazel land. I have had paying crops of fruit.

Mr. Thatcher: The idea of injury resulting from close protection of orchards I referred to in my first report as director, I still hold the opinion that large bodies of timber may, to some extent, modify the aridity of our air, but tree belts about our orchards, as usually planted, rob the orchard of needed air circulation and even nourishment. The heat generated in such situations in summer is also a serious evil. I am glad to note that the ranks of believers in this doctrine are on the increase.

Mr. Wright: I fully concur in this view as far as protection on the immediate north and west are concerned. We must avoid bottling up the heat in this way. I favor, in our section, the planting of shelter belts *on the south*. We have most to fear from some of the peculiar blistering south winds, beyond doubt coming to us from the New Mexico plains. Orchards do best with us on the northern slopes.

Mr. Hargis: On the question of high and low tops, which has been here discussed, I have had considerable experience. I have too many low-topped trees. In these the best fruit is always at the top. My most productive orchard has never been cultivated. The trees stand where the root-grafts were put out on old nursery ground. My

Digitized by Google

nursed orchard has not done so well, as the hard winters have scorched it. In the nursery orchard I have 1500 trees on 8¾ acres. They are running up more or less for daylight, but have borne good crops.

Mr. Patten: As to orchard protection, I do not believe in it, if by protection we mean a wall of trees closely planted on the north and west. But where we have an orchard of five to ten acres, screened by a tree belt a few rods distant in these directions, I do believe in it for the north. We must pay some attention in our section to winter conditions. In addition to our difference in latitude, our *altitude* is an important factor to be considered. Unimpeded wind sweeping on our northern prairies, with the temperature at 30 deg. below zero, is terrible in its effects on trees.

Mr. Hart: I spent some time the past year in traveling over our northwest counties. I can well believe that what is one man's meat may be another man's poison. Our conditions in all parts of the State as to wind sweep, soil, and even altitude, are by no means the same. Hence our varied details of experience. Judge Whiting told me that on the wind-swept Missouri bottom timber belts meant fruit, and absence of such belts meant failure every time. His orchard has tree belts on all sides, and two years ago he had 1000 bushels of fine fruit in his young orchard. In addition to this, he finds it best to start his trees with low tops.

J. L. Budd: This matter of protection to orchards by timber belts is one which is now attracting much attention in all parts of the State. A general fault is the enclosing of a little plat by a belt of cottonwood or other quick-growing trees. In this little area are planted the little orchard trees, usually after the timber belt has made quite a start. In the summer, when the foliage is on the sheltering belt, the lower beds of air in this little inclosure when the normal air reaches say 97 deg., may run up to 106 deg., which every time means damage to the newly formed cells of the young fruit trees, especially if they are crabs or varieties of northern origin. Judge Whiting's timber planting is so extended that the air absolutely is modified to some extent in its moisture and temperature. Again, Mr. Wright says in his report that Mr. Whiting's orchard covers about forty acres of ground. This is quite different from an orchard of one acre so closely surrounded with cottonwoods that their roots extend clear across the patch.

Digitized by Google

THE CHERRY, PEAR AND PLUM, CONSIDERED IN THE LIGHT OF MY EXPERIENCE.

BY L. A. WILLIAMS, GLENWOOD.

Had I undertaken one year ago to give my views on the management of the pear, cherry and plum, I should have done so with a feeling of pride at my own success, and a confidence that I might give counsel that would assist others in the management of these desirable fruits.

The wise man of old, declared that " pride goeth before destruction."

I do not know that I had more than a *commendable* degree of pride in my pear orchard, of 300 trees, and in my cherry orchard, of 450 trees, all beautiful, thrifty and apparently healthy, and just coming into full bearing, but certain it is, that in thinking of these trees now, the habiliments of sackcloth and ashes would indicate my *own* feelings on the subject, for now my entire cherry orchard is dead (save half a dozen trees) and while I mourn the loss, I cannot divine the *cause*, though I have diligently sought for it. I herewith send a section of one of my defunct trees to your Society, hoping a *post mortem* inspection may lead to more light. This section represents the condition of about one-half of the trees—the rest are entirely dead at the root.

Most of the trees were crown-grafted on the Morello stock. The variety was mostly Early Richmond. There were about fifty each of English Morello, Late Richmond and May Dukes.

Fifty of the Early Richmonds I procured of J. L. Budd, ten years ago, and they have fruited well four years; 125 were planted four years later, and bore their first, a light crop, in the summer of 1878. The remainder of the trees were planted three and four years ago. All appeared perfectly healthy during the season of 1878, and made a growth in their scions of from ten to fifteen inches. The orchard was located on high bottom or valley land, surrounded by native forest. The soil is a dry sandy loam, with a very porous subsoil, in which it is impossible for water to be retained to the injury of the trees. I suspected nothing wrong with my trees until last spring, when they seemed tardy in developing their leaves. I examined and found the inner

Digitized by Google

bark of the limbs and trunks very dark, and in some instances black. A few of the trees put out a sickly foliage of leaves, but by the last of June they were completely dead. Cherry trees in my immediate neigborhood, similarly located, were all right last spring. While I have heard of a few trees in different localities, that were killed at that time, I have heard of no wholesale loss like this of mine.

About ten years ago, I commenced planting the pear, with not very exalted hopes of success in raising fruit, or even in growing good trees. I had been warned to beware of the blight, but the school of experience was open, and fool like I went in, and learned my lesson *well*. My first planting of fifty trees, grew so beautifully for three or four years, that I took "pear on the brain," and planted 250 more, about equally of the Standard and Dwarf. The varieties were principally Bartlett, Flemish Beauty, Belle Lucrative, Beurre d'Anjou, Seckel, Clapp's Favorite and Duchess d'Angouleme. These all flourished well, and in the fall of 1878 commenced rewarding me by producing a few bushels of delicious fruit, a part of which I sold at $4.00 per bushel. Then I began to count my chickens with a good deal of confidence, that the hatch would be first rate. All went well until early last summer I discovered the first appearance of blight on my pear trees. I lost no time in applying various remedies I had heard of, for curing or arresting this disease, such as removing the affected parts of the limbs, splitting the bark with a sharp knife, root-pruning, etc., but all my efforts were unavailing, and by fall, one-half of my trees were ruined by this demon of destruction. Three years ago I applied about half a peck of iron filings and cinders from the blacksmith shops, around the roots of a part of my pear trees; those thus treated, I notice, have suffered very much less than the rest, which leads me to believe that an iron tonic is beneficial to the pear tree.

With the plum, my experience is not at all flattering. My first planting was mostly of the European varieties—Lombard, Washington and Smith's Orleans. These grew well until large enough to bear, when the trunks began to crack on the south sides. In the spring of 1877 they set very full of fruit and though a large portion fell off before maturing, I harvested some very fine fruit. The next season the injured trunks of the trees rapidly decayed and the trees soon died. For two years past I have planted the European plum, top-worked on the Miner, and hope in this way to succeed. The Miner plum has not fruited *regularly* enough to suit me, though the tree is vigorous and thrifty enough to grow for cord wood.

Digitized by Google

DISCUSSION ON REPORT.

Mr. Lathrop: We had some Lombards worked on wild plum, but they outgrew the stock and were short lived. They however bore some fruit before they died for want of sufficient sustenance from the roots.

J. L. Budd: The Miner in various portions of the State is proving a far better stock for the Lombard and Spanish King. It is a free grower and the grafts of the European sorts show as yet no tendency to outgrow the stock, nor signs of lack of nutrition.

Mr. Shaw: Mr. Williams has had a bitter experience with his cherry orchard. But we have nearly as bad in Decatur county. On the 3d of January, the thermometer with us was 25 degrees below zero. We think the damage was done at this time.

J. L. Budd: The specimen of the stem of cherry tree sent here by Mr. Williams for our inspection, shows plainly that the real damage was not done last winter as he supposes. It will be noted, on careful inspection, that no new deposit of wood-cells has taken place on the stem for the past two years except at one point, not more than two inches in extent, of the circumference. Last year the large crop, consequent on the low vitality of the trees aided in the work of destruction of the small part of the stem really alive.

REPORT OF COMMITTEE ON NEW GRAPES AND SMALL FRUITS.

BY F. W. BRUNING, KENT.

To the President and Members of the State Horticultural Society—In accordance with the Society request I will make a few notes on grapes and small fruits. The past season in Union county has been very unfavorable for fruit-growing. The frost on the 5th of May destroyed most of the blossoms and forming fruits, and I am therefore unable to speak of the fruits of many of the newer varieties which I

Digitized by Google

have growing. About thirty new varieties of the grape were prevented from fruiting by this frost. Some kinds which I grew from seed bore fruit. Some of them were earlier than the Concord, but not as good in quality, so I shall dig them up. The Lady and Croton stood the winter tolerably well, also Rogers No. 32, and Delaware. The Delaware carried its fruit well. Rogers No. 15, 32, 43, and Salem, last year produced more fruit than the Concord. These varieties, standing beside the Concord, stood more frost while in blossom than the latter. This year the Concord produced the most fruit, yet the crop of this well known sort was less than one-fourth its usual yield. We had no currants or gooseberries. Raspberries bore tolerably well. Mammoth Cluster and a seedling I have much like it, fruited best. This seedling came up under an apple tree in the orchard. Though not covered in winter it was not in the least injured in its canes. The fruit for two years has been much like M. Cluster, though some larger. I shall put out some of them next spring.

Strawberries did very well with me. Especially Kentucky, Capt. Jack, Crescent Seedling, Green Prolific, Charles Downing, Col. Cheney, and Kramer. All of these brought a full crop. Wilson and Monarch of the West produced little fruit on account of the frost. I had some blight in my pear trees and lost five trees out of one hundred and sixty. I used a wash of sulphur and lime, but cannot say that it was, or was not, of any use. I lost the most trees late in summer, though I had washed twice with the sulphur and lime. The locusts have also caused much damage to young trees. I do not know that I can come to the meeting.

DISCUSSION ON REPORT.

Mr. Wright: I wish to say a word in favor of the new seedling grape exhibited by James Stanton, of Des Moines, at the last State fair, which took the premium for the most promising seedling variety. The fruit and character of leaf seemed very promising. We much need a light colored grape taking the place of the Delaware.

Mr. Grinnell: I would like to inquire of members as to their success in growing the luscious Delaware. It is one of my special favorites, but I have failed to taste perfect specimens grown north.

Mr. Bruner, Toledo: I have fair success in growing the Delaware on low trellises.

Mr. Ireland: The Delaware seems to do far better north than south, perhaps for the reason that the summers are not so hot.

Digitized by Google

Mr. Haviland: I have grown full crops of Concord and half crops of Delaware.

J. L. Budd: I know of a plat of the Delaware where the whole surface of the ground is kept mulched heavily winter and summer with sorghum bagasse. The vines are trained on low wires and are annually loaded with fine bunches of perfect fruit. I have had some vines running in tree tops bear well for three or four years in succession. The only trouble with this grape is the rather fragile character of its leaf. In partial shade it is all right. With the low training, over the sorghum mulch, its leaves seemed to remain perfect. This experiment is worth trying.

Mr. Grinnell: While I specially like the Delaware, I also like the Concord. I long for the good time coming when every man, woman and child of our State will feast through the year on this luscious health giving fruit. How soon our long list of febrile diseases would disappear from our beautiful land. Even with the most careless management a ton of grapes can be grown on an acre. This would be ten pounds a day for two hundred days of the year. It is a fruit always in order. The first thing I look for on the table is the dish of grapes, or its substitute in other fruit. Of course we have to talk about keeping the grapes by heating and sealing. But for early winter use we want to grow varieties that will keep better than the Concord; then we want to take lessons of the experts—if we have any—as to the best methods of keeping them.

Dr. Kulp: I always manage somehow to have grapes on the table. Perhaps I have defect in taste, but my method of keeping grapes is good enough for me. Perfectly sound and ripe grapes are rubbed through a cullender, to take out skins and seeds, and then sealed up air tight while hot. I put up in colored jars. Exposed to the light it ferments. For home use it pays to give nice care and protection to some of the finer grapes. If they cost a little more trouble than the Concord, we will appreciate them for home use all the better. I do not believe in discarding the Clinton. If carefully put away when fully ripe they are delicious at Christmas. A friend keeps the bunches perfectly by sticking the cut end of the stem into a potato, then packing in dry saw-dust in a dry pit.

Mr. Case: I have found that flax straw is the most perfect material to be obtained for protecting the tender grapes, peach trees, etc. It can be laid away and kept for use for several years. Rogers' 15 has

Digitized by Google

borne fair crops with me. It is ripe about the time of the Delaware, and most people prefer it to the latter. Two out of three said they liked it best. I grow my Rogers' grapes on sandy soil with eastern slope. If we grow Clinton we must keep down all shoots at the base. The main canes will do well if so treated. The true Clinton is really good when ripe, after frost touches it.

Mr. Foster: I always wish to say a good word for the grape. It is too little used by the masses of our people. It is really more than a luxury. It is health and substantial food. It is really true that the Delaware does far better in Wisconsin and Minnesota than further south. We can grow the Concord as the great stand-by, but it is a very easy thing for every family to grow a few vines of the choicer varieties of the grape. Suppose they do cost us more to grow ten pounds of them, we will all the more enjoy the use of them in the family.

Mr. Patten: One of our Floyd county men has Delaware vines in his yard, which are now fifteen years old. After the third year the vines have been as hardy as the Concord.

J. L. Budd; The Roger Hybrid varieties are grown successfully by Dr. Phillbrick, near Des Moines, who has given his modes of treatment in our back reports. We have a brief paper from him which is given in this connection.

ROGER HYBRID GRAPES.

BY DR. S. D. PHILLBRICK, DES MOINES.

In accordance with the request of the Secretary, I present a few notes on the experience I have had with the Roger grapes during the last five or six years. I have been growing them for profit, and I have now come to the conclusion that, all things considered, it is best to select sandy soil, mixed with some clay and loam, for the planting of Roger Hybrids.

There is little doubt but that any careful cultivator can succeed in

Digitized by Google

growing these luscious varieties. I grow mainly numbers 1, 3, 13, 15, and 19. I have been experimenting with 15 and 19 in the way of making raisins, and find that they make a good article. I intend to carefully prepare some to exhibit at the next meeting of your Society. I have a few specimens at your present meeting in good condition. I think there is no doubt but they can be kept until the first of April. I shall continue to add new varieties that have been well tested, and keep you advised of my success.

In conclusion, I will say, that I have usually sold the Roger's grapes at twelve and fifteen cents per pound. I shall increase my vineyard by grafting fine varieties on the Concord roots. I have a few Delaware vines grafted on the Clinton, and a few Rogers' Hybrids on the same stock. These vines are a complete success as to quantity and quality of fruit. They have always ripened their fruit perfectly. I think by grafting the vine we can measurably stop the damage done by the phylloxera.

SHADE AND ORNAMENTAL TREES.

BY A. T. COLLMAN, CORNING, IOWA.

Mr. President—It is admitted that trees are essential to civilization; and the fact is acknowledged that man cannot advance in improvement beyond the rudest form of life without the use of timber, nor can he improve his home in any better way than to plant a tree.

When you pass a treeless home, you are led to believe that a tenant lives there, or the owner thereof is a man without enterprise. You visit him, and he can only talk about hogs; he never thought that he was placed in this world for any other purpose than to raise hogs and eat them. His children stare at you with open mouth, and a vacant look. You see no papers on the table, nor books in the house, unless you see a greasy dime novel. Oh! I pity such a family.

But you will say I don't stick to my subject, shade and ornamental trees.

Digitized by Google

We all need a few bees; so, when we plant our shade trees, let us look to our own interest and plant a few trees for our bees.

The first honey is perhaps obtained from the flowers of the red maple and the golden willow; the latter sends forth a delicious perfume. The sugar maple blossoms a little later; and from its silken tassels, a rich nectar is gathered. Honey from the sugar maple! A tree so clean and wholesome, and full of such virtues every way, would be something to put one's tongue to. The last mentioned, in my opinion, is the cleanest and best shade tree that grows.

Among your stores of honey, gathered before midsummer, you may chance upon a card, or perhaps only a square inch or two, of comb, in which the liquid is as transparent as water, of a delicious quality; that is the product of the linden or basswood. Of all the trees in our forests it is the one most beloved by the bees; as a shade tree the linden is nearly equal to the sugar maple.

All the trees that I have mentioned are beautiful, and should be found on every farm in the land. Also, the elm and ash are clean and beautiful trees, and should be added to the list, with a few butternuts for the children. All the above I would plant back of all the farm buildings, for wind-break and shelter for your stock, and to form a background for your ornamental trees. I would plant but few trees in front, and let those be beautiful evergreens. I would plant evergreens, the European larch, and some choice fruit trees to the right and left. Nearly all the evergreens are a success in Iowa. Nearly every one has some choice as to varieties. I think all are pretty and add greatly to the appearance and value of our homes. I prefer the Scotch pine for extensive planting; they stand and laugh at all the fierce storms that sweep over our country so often. They will make a perfect wind-break in winter, and in summer are perfect beauties; they can be trimmed in any shape, to suit the taste. While many like to see weeping trees near the residence, I think they look nicer over the graves of our friends. I would plant American Arbor Vitæ for an ornamental hedge; when properly trimmed, it is a thing of beauty.

Now, my friends, I have not done my subject justice; but have given you my views on home-adorning, in a general way, and I only hope that you will all plant beautiful trees, to make home cheerful and pleasant to yourself, to your children, to your friends, and to make a cheerful home for the birds; and, finally, leave a monument that will stand to your memory long after you are gone.

Digitized by Google

DISCUSSION ON REPORT.

Mr. Foster: The Scotch pine comes last with me as to relative value as an ornamental tree. The white and Austrian pines, and the red and Norway spruces, are all in advance of it in every respect. In my travels over the prairie States, I am everywhere reminded that our people do not understand the advantages resulting from judicious shortening in, and cutting back of our conifers. Some lessons have been given in this line of work on the College Farm. The pines will bear more cutting than the spruces. In transplanting pines, it is difficult to get good roots. The tops may be shortened to almost any extent without endangering life, and really the process will add to the symmetry and compactness of growth of the specimens, if the work be properly done.

Mr. Raymond: We cannot listen on the western slope to any feeble praises of the Scotch pine. At our meeting of the western society, *we talk Scotch pine*, as it really there occupies the head of our list in standing our hot winds, from the southwest, of summer.

Mr. Hart: The north and west have peculiar conditions, and it will not do to take the advice of planters on bluff soils in the eastern part of the State, especially as far north as Muscatine. A trip through the northern, and especially the western, part of the State will show that the Scotch pine will be a thing of beauty in locations where the last vestige of other species and varieties planted at same time is gone. I specially noted this at the beautiful place of Judge Whiting. He put out several kinds of conifers twenty years ago; only some fine specimens of the Scotch pine are now left.

Mr. Ireland: I fully indorse Mr. Hart and Mr. Raymond's statements. I have a special love for the evergreens. I have tried various kinds, but as yet I can only be sure of the Scotch pine. I have one fir left, looking passably well, and the Norway spruces just pass for being alive. The Scotch pine forms a perfect cone, with a little trimming, and its color is at all times refreshing.

Mr. Keller: I live on the divide in Adair county, and the Scotch pine is our best thing in the line of evergreens. I have a specimen trimmed up three feet, which has a perfect top twelve feet in height. I regard it a treasure. Red cedar with us is next to Scotch pine.

Mr. Ireland: I like red cedar for forestry plats, but I cannot say it is ornamental as a lawn tree.

Mr. Haviland: Balsam fir has not done well with me. Austrian

Digitized by Google

pine has nearly kept up in growth and beauty with the Scotch; but the Austrian does best in groups. Cedar is not worth much for lawn specimens, but does well in groves, and is well worth planting. I have several species of Rocky Mountain evergreens. A specimen we have of, what we suppose is, Abies Engelmanni, is a thing of real beauty.

The report of the fifth district was now called for and read.

REPORT OF DIRECTOR OF THE FIFTH DISTRICT.

BY H. W. LATHROP, IOWA CITY.

The year 1879 in this district has not been a favorable one for the apple crop, and yet it has been a peculiar one in some respects. Of summer apples there was an abundance. At times the market was overstocked with them. The Oldenburg has sustained its well earned reputation for being a reliable bearer, having few "off years." The Red Astrachan never did better. Benoni only a moderate crop. Maiden's Blush and Fameuse did moderately well. Of winter apples there is a great dearth, and in all our large towns Michigan apples are finding a ready sale at prices ranging from $3.75 to $4 per barrel. Occasionally an orchard has borne a good crop, but such orchards are exceptional ones. In my own, from a half dozen Red June trees I did not gather that number of apples, while in a neighboring orchard on the same kind of soil and with the same exposure as mine the trees were full, and the orchards are not forty rods apart.

In the list of winter apples the Willow Twig has produced the best crops. The Ben Davis, that rarely ever fails, has defaulted this year. During the month of October the weather was very warm, I might say hot, and under its influence apples, whether gathered or on the trees, were subjected to a severe ripening process, and therefore they are rotting very badly. Such varieties as Willow and Rawle's Janet, that are usually our March and April apples, are this year ready for use in January.

The crop of strawberries was a full average, but not enough are

Digitized by Google

raised to meet the home demand, and many in the early part of the season are shipped in from abroad.

Raspberries were abundant and of good quality, more of the black-caps being raised than formerly. Mammoth Cluster is the leading variety.

Of plums we never see any in market except the wild ones gathered from the native groves, or from trees transplanted from those groves. The Miner, of which so much has been expected, although blooming abundantly every spring, fails to produce fruit to any extent; but in some parts of the district Miner plums are brought in from Jackson county and sold by the bushel. The trees of this variety growing in the district are healthy and vigorous, and many of them have attained an age and size sufficient to produce a good supply of fruit. Whether the failure to fruit results from a defect in the flowers or from some other cause I have no means of determining; but as the trees are vigorous, and apparently withstand all the adverse vicissitudes of our climate, I have suspected that their barrenness was the result of defective flowering.

Cherries were plentiful, and the trees came through the winter in good condition. Early Richmond, English Morello, and the common sour Morrello are the only varieties grown.

Of pears there was a better crop than usual. Home-grown fruit made its appearance on the stands of the apple men at the street corners. It is yet an unsolved problem whether pear culture can be made to pay in this part of the State. If some variety could be grown that would withstand the withering influences of blight it would be a most desirable acquisition, even if it was only of a second or third rate quality.

Grapes continue to be used about Iowa City in large quantities, and they form during the vintage quite an article of exportation. The market, aside from what is needed for home consumption, is found in Minnesota, Nebraska, and the northern and western parts of this State. The price has not varied much for the last few years, more being sold for 2½ and 3 cents per pound than at any other price. No insect or disease has as yet affected the fruit, but in some vineyards more or less vines have died during the past year. In my own vineyard about five per cent died, or became so nearly dead as to become fruitless. In the vineyard of Charles Cartwright, near mine, the loss was about the same, while in the vineyard of Levi Robinson, nearly adjoining the other two and lying between them, not a vine suffered; but in a small

Digitized by Google

vineyard within the city limits, where the vines have always been well cared for, seventy-five per cent of them died.

Of insect enemies the round-headed borer and the codling moth are the worst and the most difficult to contend with. Rarely have apples been more wormy than they were last season. The moths were so numerous that there were hardly "apples enough to go around." In many orchards the fall web-worm is on the increase, but it makes its appearance so late in the season that but little injury results from its depredations; but its nests give the trees an unsightly, if not slovenly appearance.

There are so many conditions attached to the successful production of fruit, especially the apple (and that is the fruit we are most interested in), that in the same location as to soil, climate, and exposure, where some succeed others will fail. In the older apple-growing sections of the country, where the yield of the orchard is relied upon to pay the taxes, liquidate the grocer's bill, satisfy the pew rent, and furnish general "pin money," all the conditions of success or failure that are under the control of the orchardist are studied with an intense anxiety, and a zealous forethought is brought to bear upon that industry which is in most cases an augury of success.

With us it is too often the case that the orchard is not thought of as being a source of revenue that will help to fill the depleted pocket. It is too often planted merely to furnish apples for the family table, and the planting is too frequently the last as well as the first thing done to it and for it. Trees, as they generally come from the nursery, are headed too low, and as soon as they become well established in orchard should be pruned up till the lowest branches, if the tree is of a spreading habit, should be five feet from the ground, and if of a more upright growth four feet. The pruning should be so done that the lowest branches shall be the largest and longest, and the after training should be conducted with a view of keeping them so. All in-growing and cross-growing branches should be cut away. Every branch should grow from the center upward or outward. The best time for pruning, especially if large branches are to be removed, is soon after the new growth is perfected and ready for winter, and the leaves have dropped and ceased to perform their office. If pruned at this season, the gum, starch, and sugar that have been stored up in the wounded part for the production of sap and the elaboration of next year's growth will during the winter become so insoluble and the wood become so dried that no

Digitized by Google

sap would exude, consequently no acid would be formed in the cell structure of the wounded part of the tree, and the new growth would eventually close over a seasoned portion of wood which would be powerless to initiate decay in the surrounding parts. Pruning at this time of year more nearly corresponds with nature's pruning in the forest than that done at any other time of year, and nature's pruning never leaves wounds on the body of the tree.

Hedging is receiving less attention than it used to, on account of the improvement in barbed wire fences and the cheapness of their construction.

DISCUSSION ON REPORT.

John Smith: The codling moth has been very bad the past year. I think the woodpeckers should be encouraged in our orchards. The little worms, I have observed for eight years, crawl into chinks in the bark of the trees and spin a silken case like delicate tissue paper. The woodpecker industriously seeks these out, and to such an extent that the moth is not very abundant near the haunts of this bird.

Mr. Calkins: When the apple crop is light the codling moth is most manifest in the fruit. When the crop is plentiful the eggs are dropped in the calyx of only part of the specimens.

President Watrous now announced that he had received a scolding letter from, Mr. Gideon, of Minnesota, claiming that some omissions and variations in shades of meaning had been wrought by the Secretary in his paper on seedlings in last report, and in reporting his remarks. By vote of the society the paper was ordered to be returned to Mr. Gideon for elimination of personal matter before publishing in our annual report.

On motion the society adjourned to seven o'clock.

Digitized by Google

EVENING SESSION.

Society convened at hour appointed.

The auditing committee reported that they had examined the accounts of the Treasurer, and found the same correct.

On motion the society now proceeded to elect officers for the ensuing year.

Messrs. Foster, Wright, and Lathrop were appointed tellers.

Mr. Foster suggested that before proceeding to the election of officers the place for holding the next annual meeting should be determined.

A petition signed by many prominent citizens of Cedar Rapids was presented.

A petition was also presented from the citizens of Keokuk.

The Davenport Academy of Science kindly proffered the use of hall, and all the customary privileges.

Mr. Speer, in behalf of the citizens of Cedar Falls, proffered the free use of hall, etc.

Some time was spent in the discussion of the relative advantages of these several points of meeting.

On motion of Col. Scott it was ordered by unanimous vote that the point for which the greatest number of ballots were cast should be declared the place for holding the next meeting.

The whole number of votes cast was 68, of which Cedar Falls received 27.

The President announced that the next annual meeting would be held at Cedar Falls.

On motion of Col. Brackett the Secretary was authorized to cast a vote for C. L. Watrous for President.

E. H. Calkins was elected Vice-president, H. Strohm Treasurer, and J. L. Budd Secretary, in the same manner.

The following directors were then elected for the ensuing year, by ballot:

Second District	JOHN N. DIXON	Oskaloosa.
Fourth District	SUEL FOSTER	Muscatine.
Sixth District	J. WRAGG	Waukee.
Eighth District	R. P. SPEER	Cedar Falls.
Tenth District	A. H. LAWRENCE	Le Mars.
Twelfth District	L. G. IRELAND	Sibley.

Digitized by Google

The full list of officers will be found on preliminary pages of this report.

The President now announced that the address of Hon. A. S. Welch was in order.

THE LAYING OUT, FENCING AND PLANTING GROUNDS AND YARDS,

BY PRESIDENT WELCH.

The subject assigned me is "The Laying out, Fencing, and Planting Grounds and Yards."

I freely confess my embarrassment, both on account of the breadth of the topic and my lack of preparation. However, if a plain and simple talk for half an hour on the principles that underlie the beauty of ornamental grounds will be of interest, then I am at your service.

There is a very general misconception of the purpose of beauty in its relation to the practical and the useful. Whatever is beautiful, is thought to be antagonistic to that which is useful. Men continually decry higher art as though it were hostile to the progress of industry. But the real truth is, beauty is the crowning perfection of that which is useful. Every creation of labor attests its excellence by the presence of beauty. What is more, every man, whether learned or ignorant, rich or poor, longs for beauty in everything he looks upon. Improvement in all the things that make life happy is only a harmonious increase of their *beauty* and *use*. Let us see. The very finest specimens of fruit on the tables before me owe their excellence, not only to their delicious flavor that appeals to the taste, but to their size and color, and form that appeal to the eye. Retain the bare quality of use and subtract that of beauty, and they would by no means take the premium. So it is with all the products of the farm. Beauty is the very proof of their excellence, while ugliness marks the lack of real value. The lank steer, which is all horns and legs. and whose body is bounded by angles and broken lines is not only comparatively value-

Digitized by Google

less, but he is ugly to boot, while the symmetrical Short-Horn not only supplies our best beef, but his form is the highest perfection of bovine beauty.

These principles apply with equal force to the laying out of grounds. In fact, beautiful grounds unite in perfection the ideas of convenience and grace of outline.

Let us see if we can trace some of the elements of form which constitute beauty in the grounds that surround a home. First, all forms are bounded by lines, and the quality of beauty lies in the curves on their surfaces. All beautiful objects, that is objects of the highest beauty, owe their attraction in large part to the variety of gentle curves that make up their outlines. Nature never finishes off her finest products with straight lines. Her fruits are rounded; her branches bent; her leaves cut into graceful curves; her sky is arched; she never plants her trees in right lines, nor gives her products angles, except in the process of crystallization under ground.

In laying out our ornamental grounds we shall not err if we follow nature, especially in her happier combinations. Our trees, if we copy her best models, will be planted in varying groups that never repeat each other. Our walks and roads will be gentle curves running just where they best suit our convenience. Then the lawn is only Nature's best specimen of a beautiful surface whereon the blue grass and white clover are kept in the highest possible condition, and consequently grow in perfection. But a perfect lawn, which is perhaps the highest adornment of a beautiful home, is the reward of labor. It requires an unusual combination of work, skill, and patience. First, the ground must be pulverized to the finest tilth. Then smooth it with the harrow, the roller, and finally with the hand rake, and lastly sow, if possible, in wet weather, and roll again. Then wait and mow the weeds when they appear, and always before they seed. About the second season a velvety surface bright and beautiful will greet your eyes.

The planting of trees requires a similar expertness and patience. Select from the native forest the most attractive and hardy. The elm, the sugar maple, the black and white walnuts, and the green ash are among the best. Group these trees along your roads in such a manner that the groups shall serve to determine the curves of the road. Never mingle trees of different form and foliage in the same group, lest you produce a discord thereby. It is, therefore, safest to plant trees of the same kind in a single group. A group of maples contrast pleasantly

Digitized by Google

with a group of elms, and these latter equally well with a group of walnuts. But we must not neglect the evergreens, of which we have in Iowa a goodly variety. Of these the Scotch and Austrian pines are the hardiest and best. These may be planted with excellent effect nearer the dwelling, while the deciduous trees stand at a distance.

In the business of beautifying homes we do not give attention enough to the background. I like a thick growth of deciduous trees behind the dwelling, so that in the season of foliage it may look like a gem in an emerald sitting.

But it is not, after all, the results reached in home-making, but the actual effort in creating it that gives the greatest enjoyment. That home which is made for us to order by the work of another, is not the home for me. For one of the most delightful pastimes that relieves our severer labors is the hour that may be given daily to the improvement of our homes. Moreover, in this fascinating work, we improve ourselves as well. Whoever lays out and gradually builds up an attractive dwelling, becomes, to that extent, a genuine artist. He sees *mentally* the finished landscape long before he attains its reality. The beautiful picture which his imagination has created, affords constant delight as nature, under his guidance, slowly turns it into fact. Home-making is, therefore, even better than home-having.

But who can estimate the benign effects of a beautiful home as a means of education? The children in such a home must, in the nature of things, imbibe something of its refinement. It stands in the neighborhood as a perpetual model on which other homes may be made, and all who look upon it are the better for its influence.

RAINFALL AND TIMBER IN IOWA.

BY PROF. GUSTAVUS HINRICHS, IOWA CITY.

The subject assigned me is "Meteorology in its relations to timber and tree growth." But I must respectfully request permission to restrict myself to the subject placed at the head, and continue to give re-

Digitized by Google

sults of actual observations which we may compare to the known distribution of our timber. I believe that faithful statements of facts are of much greater value than elaborate theories and speculations, although they may be less attractive.

The first more general result indicated by the mapping of the observations of rainfall at the stations of the Iowa Weather Service is the remarkable concordance between the distribution of rainfall and timber. The maps for 1876 and 1877, show this relation in an unmistakable manner; the map for 1878, exhibiting a less considerable diversity of rainfall for the different parts of the State, is necessarily less conclusive.

The meeting of the Society being early this year, the corresponding returns for 1879 cannot be submitted, as the reports for November have not yet been received, and December has but just begun. But we may profitably examine the distribution of the rainfall of the State for the summer season just closed, that is for the months of June, July and August.

As the full returns from the stations will be published in the Iowa Weather Report, it may be sufficient here to submit the graphical representation of all these data in the map A, giving the lines of equal rainfall for the season. On this map the lines for eight, ten, and fifteen inches of rain are drawn. The field unshaded represents those portions of the State where the total rainfall during the preceding summer months amounted to less than eight inches. It will be seen to embrace nearly the entire northwest and two belts, one running down from Woodbury to Audubon and Pottawattamie counties, the other running from Wright to Marshall and Tama counties, and showing a very narrow continuation east of the Des Moines river to Lee county. The light shaded field represents those parts of Iowa, which during our last summer received between eight and ten inches of rain; it comprises a belt of about twenty-five miles, skirting the region of lowest rainfall above described. The territory which received between ten and fifteen inches consists of two distinct regions; one reaching from our southern boundary up to Dallas county, the other passing from the middle Mississippi river westward to Floyd and Iowa counties. But a very small territory received over fifteen inches of rain last summer; the smaller of these we find in and near Wayne county, while the larger tract comprises Jones, Jackson and Clinton counties. So much by way of explanation of the facts recorded in the map.

The most striking features of this map consist: *First*, in the re-

Digitized by Google

gion of *high* rainfall down the line, drawn from Chickasaw to Jackson county, and from Webster to Wayne county, with a line of less marked increase from Monona to Fremont, near the Missouri river; and *Second*, in corresponding lines of *low* rainfall, one from Hancock to Tama, with a narrow belt down to Lee county, and a second from Woodbury over Audubon to Pottawattamie county. Finally, we may distinguish a secondary line of high rainfall from Iowa to Louisa county.

These lines of high and low, or greatest and least rainfall have been entered in black ink upon map B. This map also gives an enlarged copy of the timber map of the State, published on plate 1 of the Iowa Weather Report for 1878, and based upon the census returns of our State for 1875. On this map only the timber lines representing one-half, five, fifteen and twenty-five per cent of timber area are entered.

If on this map we were to draw lines of greatest and least timber area, they would evidently run very near the lines above described as lines of greatest and least rainfall. It is true, the timber lines corresponding would run a little to the east of the rain lines drawn—but that is probably due to the prevalence of easterly winds which have characterized our summer this year. The only notable deviation of rain lines from the corresponding timber lines we have in the eastern line of low rain, which divides near Webster City, and may be traced in two branches to Linn and Lee counties, so that instead of a single broad valley or line of low rainfall, corresponding to the broad gap between the lines of fifteen per cent timber between the mouth of the Iowa and Maquoketa rivers, we have such a valley with a small ridge of secondary maximum rainfall from Iowa to Louisa counties.

Now, as the amount of rainfall depends on prevailing winds and other causes connected with the more general circulation of the atmosphere, a closer correspondence between timber and rainfall lines than above described could not well be expected.

The extended series of rainfall observations made during this year's summer at the stations of the Iowa Weather Service, have therefore again proved that the distribution of the timber, exerts a marked effect on the distribution of the rainfall.

In conclusion, I call attention to two of my full series of Decade Rain Maps, of which rough pencil copies are herewith submitted. These maps for the first decade of April, and the last decade of July, 1879, show that at times this effect may already be observed in the results of a single decade.

It may yet be added that during middle spring, rainfall at times is

Digitized by Google

greatest where timber is least; in these same regions frosts are most frequently injurious to early vegetation. I shall not now enter upon any explanation of these apparently contradictory facts, but simply accentuate the importance of real study by extended observation and reduction, such as we are endeavoring to carry on at present. The numbers of the Iowa Weather Report already published give an indication of the extent of the data now being accumulated in reference to this, as well as to other questions bearing on the climate of our State.

The address of Prof. Lummis, on the lawn and flower garden was now in order. Only the leading points of his address can here be given.

THE LAWN AND FLOWER GARDEN.

BY PROF. W. D. F. LUMMIS, PATON, IOWA.

The subject assigned me by your President is new to me. The theme is equally suitable for the Agricultural and Horticultural Societies. In passing I may say that though the avowed object of these organizations is to gather and distribute information from data brought here from all parts of the State in respect to the cereals, the grasses, the trees, the fruits, the live stock, and in general the material interests of the tillers of the soil, yet the immaterial, or if you please the æsthetic interests of home concern you all, and I need make no apology for introducing it. The masses are as yet hardly ready for patient and intelligent listening to talks of this kind, yet here and there we have those who long for the coming day in their surroundings, and who would like to know how to make a lawn or flower garden. The *few* really are anxious for information as to what they shall plant, and how the work shall be done to ensure the desired effect and success.

While my theme is "the lawn and flower garden" I do not wish to be understood as advocating a separate lawn and a separate flower garden either in country or village. The two should be wedded.

Digitized by Google

No more should the lawn be deprived of the finish and glory of the flower and shrub border, than should the ornaments of the lady's outfit be placed on one spot of her dress or shawl.

It is proposed to outline the subject in the following order:

First. As to the place for the lawn and flower garden.

Second. As to the amount of land for it.

Third. As to the form of it.

Fourth. As to what should be in it.

1. As to the place for it. Let it, if possible, be on the street that every one may see and share with its owner, not only its beauty, but its good influence, which, not so mutely, is forever (like Addison's stars) singing to the passers by "Go and do thou likewise for others."

In order that it may be as compact and as little broken up as possible, I would say, place it at the right or left of the dwelling, where you and family may look over it winter and summer, from your sitting room windows. This means, build your house on one side of your lot, and perhaps half way from the front fence to the rear of grounds. It will do for the English Lord to place his lawn in the rear of his mansion, and *it may do* for the wealthy retired Yankee, who—nor his wife either—has never spent a moment's thought on the subject, to pay a perambulating gardener who happens along $100 to lay off the lawn in the rear of the mansion, where no one but the city company may ever have peeps at its beauty and wealth of bloom. This spirit of exclusiveness smacks all it can of aristocracy, and as little as possible of the republican notion "for the good of the whole."

2. The amount of ground for the lawn. To give practical advice on this seems difficult. Experience demonstrates that east and west the rule seems to be, the more space devoted to lawn the less ornamentation do we find. With moderate means the large areas are found with the old oaks and hickories doddered with wild coon grape vines doing ancient service for more modern and more costly shrubbery, trees, and flowers, while a sickly fuzz called grass is pretending to be carpeting the same. I may suggest the apportionment of area for grounds as follows: To the rear of dwelling should be planted, about in this order, the asparagus bed, the vegetables, the small fruits, the pears, and cherries, and next the ornamented grounds, the plum and crab apple, alternated perhaps with an evergreen, a larch, or other ornamental tree. The Greeks talked about their "To kalon" and "To agathon"—the beautiful and the good. So we can talk about our *To kalon*, but when we talk about "To agathon" we mean the Latin

Digitized by Google

utilitas. Our *good* has been swallowed up by utility. The Greeks had about the same apparent idea.

3. The form of the lawn. This is really the difficult part of the subject, as it is not easy to tell on paper the exact adjustment of things on the varied plats we may wish to adorn, for no two lawns should be laid out in the same manner and form. Each plat should be laid out in accordance with its aspect, shape, size, and surroundings. The planning of the dwelling, hotel, or church, is quite a different matter. The architect may appropriately enough submit a copy of a building of like character of some other country or town.

But if we employ a copyist for landscape work we are quite sure to get the aspect of the artificial, rather than the natural and beautiful. The flower bed on the lawn should be, or appear to be, an auxiliary to heighten its beauty, and should take its shape from the necessity of the occasion; or better, it should take its shape from what the lawn has first brought into form.

The primal idea of the lawn is a grass plat set with ornamental trees and shrubs, and the flower beds are the borders of the picture. Yet, whatever its extent, the lawn may have its divisions and subdivisions permanently fixed by appropriate trees and shrubs either deciduous or evergreen, with perhaps climbers at points suggested by an educated taste.

The flower beds are to take the shape and form that the laying out of the grounds necessitates. They may be straight and long, running to no point of the compass; semicircular, or curvilinear and placed in natural position on either side of the walks, cutting the lawn into shapes and forms creating pleasant surprises to visitors, and the members of the family. (Special adjustment of trees, shrubs, walks, flower beds, etc., to grounds with varied aspect and position were at this point delineated by the professor on the blackboard. Without plats his views could not well be given in this connection.)

4. What should be in the lawn. This is an important, and should be an interesting, part of our subject. The first idea presented to us is that very many of our prairie settlers of Iowa are yet poor, and hardly able to obtain the expensive exotic trees, shrubs, vines, and flowers. Fortunately for this numerous class we have enough, that cost but little more than the cartage and digging, to make the humblest lawn a thing of beauty. If, as the years go on, a native tree or shrub be rooted out and thrown over the fence to give place to some-

Digitized by Google

thing more graceful and perfect, who shall say that such changes in the lawn do not afford one of the chief delights of the owner of a leafy home. In selecting and setting let us always avail ourselves of the *pleasure-giving principle* of *variety*. Let us surprise our friends by showing them the four varieties of the maple found in our groves. Let us find a place for the black and white walnut; and even the hickory will be a pleasant surprise on account of its rarity in such places. The oaks, and the extremely varied willows, should also find a place on grounds of considerable extent. The elms are also interesting in proportion as we contrast the different forms of the family—not forgetting the hackberry. So of the birches, instead of planting several trees of one variety, plant specimens of all species and varieties obtainable. The buckeye is found on the Des Moines river as high as Boone, and is always interesting. The catalpa is also at home with us; the wild black cherry, mulberry, Kentucky coffee, the poplars, the cottonwood, the beautiful ashes, the locusts, the hornbeam, juneberry, Buffalo berry, European and native larches, and many other beautiful trees, may be used to give variety and create perpetual surprises as to the extent and succession of contrasts presented in various portions of the grounds.

In the line of shrubs we need, as we can secure them, the Weigelia Rosea, Snowberry, Cord berry, Snowball, lilacs, Rose Acacia, several of the spireas, Missouri currant, Elder, Bladder nut, the syringas, False Indigo, Dwarf Juneberry, Flowering Almond, the Barberry, and very many of our native shrubs indigenous to our prairie groves and openings. I may specially note some varieties of the beautiful dogwoods ornamenting the hidden nooks of our creeks and thickets. I should also not forget the beautiful thorns found in our thickets, and the equally desirable native crab apple.

As surprising as it may seem to those who have given the matter little attention, we have over seventy species and varieties of ornamental shrubs, easily obtainable, with which we may surprise the visitors to our grounds, without including the roses, of which no home should be destitute.

Of the climbers we have fully fifty which are more or less known in the flower garden. The Ampelopsis should be given a tree to be ornamented with its deep green in summer, and its rich red in autumn. Then, by the portico, or at some other suitable point, we need the Trumpet creeper, with its thick foliage and nodding clusters of scarlet trumpets in harvest time. Then, to a tree or frame, we should train

Digitized by Google

the vigorous growing Bittersweet, with its beautiful white blossoms, and purple fruit clusters in autumn. Some of the varieties of clematis should also be given a place. Our native Clematis Virginiana, is a good climber, and has the singular habit of taking a turn about twigs by its long leaf stalks as a substitute for tendrils. Its snowy sheet of white blossoms has given it the appropriate common name of "Virgin" Bower." The Honeysuckle, too, should be more common about our western homes. It is associated with our eastern homes as is the "old oaken bucket." Of the wistarias, the *Frutescens* we find very hardy, and a very rapid grower. Its nodding pendulous foliage, and large full clusters of blue labiate flowers, render it very desirable. Some of the green briars have also their appropriate place by some tree in a sequestered place. The Pipe Vine *(Aristolochia sipho)* is also a pretty thing on a trellis. The leaves are from four to eight inches in diameter, and round and velvety. A perfect specimen of this I think was the most beautiful object my eyes ever rested on.

But I cannot enumerate the long list of the fine climbers we may have. I may merely name some of the herbaceous climbers, desirable in their proper places. The Passion Flower, Cobea Scandens, and Apios Tuberosa, are specially desirable. Of the latter I saw some nice plants between Ames and Des Moines. It is much like the Wistaria in foliage, but its flowers are pink. The Everlasting Pea will fill a large frame, with its fine foliage and flowers, early in summer. Of the annual vines, the Cypress, Balsam Apple, Morning Glory, Balloon Vine, and Climbing Fumitory, are desirable.

The distribution of climbers requires thought and taste. A main idea may be to have a climber in every division of the lawn.

The perennial flowers should have a word. These must have their places assigned with special view to habits of growth and expression. The Tiger Lily, Yellow Day Lily, Flower de Luce, and wild lily should have positions as clumps in appropriate places.

So the Yucca Filamentosa, the Crown Imperial, the Penstemons, the Spiderwort, the Peony, the Phlox, the Dicentra, the Herbaceous Spireas, the Bee Larkspur, the double Buttercup, the perennial pinks, Aquilegia, Fox-glove, and Snap-dragon are all worthy a special notice for the benefit of those not acquainted with their rare beauty and ease of management. The same may be said of the plants filling their place on the lawn in summer, whose roots must be stored from frost in winter; such as Dahlia, Canna, Caladium, etc.

Digitized by Google

The bulbs, such as Crocus, Hyacinth, Tulips, together with the Daisies, for certain reasons should be in separate beds.

It may seem that such an extended enumeration would fill a very large place, but in practice a long list on paper may give beauty and variety to grounds quite limited in extent.

Of the annuals used to fill up the vacant places I should choose about the following from the great list: Balsams, Asters, Candy Tuft, Calliopsis, Catchfly, Cockscomb, Callirhoe, Mignonette, Petunia, Zinnia, Drummond Phlox, Poppy, Portulacca, Salvia, Sweet Pea, Verbena, and Amaranth. About all of these may be had of dealers, in variety.

I would suggest that those who have not tried it would not believe the effect we may produce by a varied bed of Hollyhocks. The recent varieties are many of them as double as the rose and as varied in colors. The bed will last for years.

In connection with the lawn I wish to say a word about the evergreens. The danger in their use is *overdoing*. They are small when set, and our people do not like to remove the surplus ones as they attain size and age. Only set an evergreen where a *real tree* will be needed. Assume in setting that it has already attained the age and proportions of twenty years' growth. On large lawns they can be judiciously used in clumps, and with alternations of sorts on the borders. At best the evergreens are, like our overcoats, for winter enjoyment, and they should be distributed with this cardinal idea constantly before us.

Of species of the conifers the White Spruce stands well at the head. It is hardy, and has a pale silvery green which is peculiar to itself. The Hemlock is a thing of beauty in a sheltered position. Norway Spruce is stately, and has a place in the lawn picture. The Chinese Arbor Vitæ is beautiful at all seasons. The White pine, Scotch pine, Red pine, and Austrian pine all are beautiful in proper place and relative position.

On motion the society adjourned at a late hour to nine o'clock in the morning.

Digitized by Google

THURSDAY MORNING SESSION.

Session opened at nine o'clock.

Col. Scott said that by request he wished to offer a resolution.

Resolved, That it is the sense of the Iowa State Horticultural Society that justice demands that the inoffensive orchard and fruit lot should be permitted to run at large, and that live stock of all sorts should be restrained by those who have profit therefrom.

Resolution was supported.

Mr. Dixon: There is some feeling on this topic, and it may be well for this society to let it alone. Some portions of the State have timber and some are destitute. As a society we had better keep within our province.

Mr. Raymond: *It is* our business, as individuals and as a society. It is truly a question of deep interest to fruit-growers, and further, it is a question of progress in the wealth, improvement, and even civilization of our chosen State. I can see no sufficient reason why the fruit-grower, who may not own even a cow, should be compelled to barricade his trees and plants to guard them from destruction by hungry cattle going about in a lawless way seeking to destroy the crops and trees of a neighborhood. Such relics of the barbarous ages have long since disappeared in Europe.

Mr. Ireland: I cannot see that the view of Mr. Dixon, that this should be a subject excluded from our deliberations, can be sustained. I shall freely vote for the adoption of the resolution.

Resolution adopted.

Col. Brackett now offered the following:

WHEREAS, The necessity of having some standard works on horticulture for reference in deciding important questions in nomenclature has long been felt by this society; therefore,

Resolved, That the sum of twenty-five dollars be appropriated from the funds of this society for the purpose of purchasing standard works on horticulture, to form the nucleus of a library to which additions may be made from time to time, and that the Secretary shall be custodian of the same until a permanent place shall be obtained for their safe keeping.

Motion supported and adopted by full vote of society.

On motion it was now ordered that the money be expended by the executive committee.

The report of the fourth district was now read.

Digitized by Google

REPORT OF DIRECTOR OF THE FOURTH DISTRICT.

BY HON. SUEL FOSTER, MUSCATINE.

Mr. President and fellow-members—The spring season opened favorably, with reasonable rains for tree planting and for small fruits.

We had a fair crop of strawberries and raspberries. The Turner, for home use and for careful and short carriage to near market, continues to be profitable and to bring two cents per quart more in market than other varieties of the raspberry, and is sought by those who appreciate *luxuriously good fruit.*

Br. Barnard continues to raise good crops of the Barnard blackberry. Quite a number planted the Snyder blackberry last spring, and hereafter we shall have an opportunity to try it beside the Barnard, which I think is similar.

Grapes and cherries rather a light crop; pears, ditto; apples, ditto. For two years past our apple crop has been very light, while the apple crop throughout all the eastern country was very abundant in 1878. Why our crop failed we do not understand. We think we understand why our orchards produce but half a bushel to the tree, as reported by the census of Iowa for the year 1874. They ought to have averaged ten half bushels instead of one.

The annual loss to our State foots up to millions of dollars by our people having planted unproductive, instead of productive trees. We charge this error: First, to the want of mental culture; and, Second, to the ignorance and fraud of tree peddlars. I have spoken more freely on this subject in another paper.

The blight was less on my pear trees than in former years. The year before it was severe on some bearing Willow Twig trees, but less this year. I washed nearly all my pear trees with a wash of lime and sulphur. I also washed a part of the Willow Twig trees in the apple orchard. I can as yet see no difference in the washed and unwashed trees. But the blight was more severe in my nursery than I ever knew it. I attribute it to manure which had been applied two years before, though not heavily.

Digitized by Google

DISCUSSION ON REPORT.

Mr. Foster: With me the pear tree has usually been of few days and full of trouble. The past year we have had much trouble with the leaf blister on the pear and apple. I sent some of the leaves to the *Prairie Farmer*. They were submitted to Prof. Burrill, who reported that it was caused by a small mite puncturing the under side of the leaf.

Prof. Bessey: It has happened that this particular thing has fallen under my particular observation. While searching for fungi in 1876, I collected a quantity of leaves of the pear and examined them with care. I found that the well known brown spots on the leaves were caused by a minute mite related to the disgusting little creature (Sarcoptes Scabiei) which by burrowing in the human skin causes that uncomfortable trouble the itch. This mite of the pear leaves burrows into the pulp of the leaf much as its relative does into the skin, and by destroying the green cells—the working cells—of the leaf it of course seriously interferes with its working powers. The little pest is extremely minute and requires a good microscope to make out its shape and structure. In shape it is oblong and when in its larva state, when it is doing its greatest damage, it is provided with only two pairs of legs which are near its anterior (head) end. It is not known—so far as I am aware—in what condition, or where it passes the winter, but I suspect that the eggs, or possibly the adult individuals, are between the scales of the leaf buds. Until we know more as to its life history we cannot do more than suggest possible remedies. I do not think that whitewashing would do any good unless indeed the adult mites pass the winter on the ground or in the rubbish at the base of the trees. In that case the lime coating might possibly deter them from ascending the tree. Picking off the affected leaves and burning them would be a feasible and certain remedy in small orchards of young trees.

The little pest has come to us from Europe and was long ago described under the name Typhlodromus Pyri, and its English name ought to be pear scab mite. A main point in fighting it will be to find out where it passes the winter. Our young entomologists of the State ought to give this fellow their most careful attention.

J. L. Budd: The puncture of leaves by the mites and its effects upon the leaf I have given some attention to for several years. My attention was first directed to it by D. B. Weir, of Illinois, in connec-

Digitized by Google

tion with the leaf rust of the cottonwood. I know of no method of dealing with it only to grow, so far as we can, such species of trees and varieties of fruits as are least affected by them.

John Smith: I have noticed that this form of leaf blister is very ccmmon on the Rome Beauty, and White Winter Pearmain. The rust on the leaves is a common accompaniment.

Prof. Bessey: We have good microscopes at the Agricultural College, and we shall be pleased to carefully examine, study, and report on specimens which may be forwarded to us. In sending leaves pack in moss where obtainable. Where not in reach pack in several folds of paper. Where put in an envelope they become dried and crumbled.

Mr. Smith: I should like to have the scab on the apple investigated.

J. L. Budd: We sometimes have forms of the rust or scab on the apple in connection with slight indentations in the fruit. In such cases there is now little if any doubt that the trouble is caused by the puncture of the apple curculio. The rust spots to which the Red June, White Winter Pearmain and Fameuse are so subject is more difficult to understand. I think careful investigation will result in fixing upon some of the forms of plant lice as the culprits who prepare the way for the lodgement and growth of the fungus. Some experiments in Illinois are favorable to the belief that a plentiful dusting of lime about the time the fruit begins to scab will prove a decided benefit.

Mr. Case: Of late years the wild mulberry has exhibited on the new growth dark spots and punctures. I have not been able to assign a cause.

Mr. Shaw: I have for several years believed that one of the great causes of scab on apples, was the puncture of the apple by the curculio when it (the apple) was about the size of a well-ripened Concord grape. Last spring, for the purpose of testing the matter, I tied on the limbs of trees that were the worst affected strips of muslin, probably one hundred in all, and noted in my book, thus: "Limb east side, eleven apples; four highest from the ground not punctured by curculio." In every case apples not stung escaped the scab; I would estimate one-third of the punctured ones were scabbed badly of such varieties as Red June, Fameuse, Winesap, Sweet Romanite, and White Winter Pearmain. While Rawle's Janet, Willow, Ben Davis, and Stark, no matter how badly stung, were entirely exempt from the scab.

Digitized by Google

There are very likely other causes for the scab, yet I have failed, thus far, to find them in my experiments. We know that an animal that receives a cut or wound in the summer, will have maggots on it in a few days if not cared for: may there not be some similarity between animal and vegetable life in this respect?

REPORT ON THE CHERRY, PLUM, AND PEAR.

BY B. A. MATHEWS, KNOXVILLE.

The past two years have been the poorest, I think, in my experience to furnish satisfactory material for a report on the cherry, plum, and pear. Both seasons being characterized by heavy frosts late in spring, and almost unprecedentedly hard hail storms when fruit was small. Of these fruits, however, the cherry has done the best: last year bearing a good crop, this season about one-third of a fair yield. I had some new sorts in bearing this summer, among others, Empress Eugenie, and Dyehouse—nothing particularly desirable about the latter, but the Empress is a large rich cherry and promises to be hardy enough here. The Love Apple cherry is also a large, excellent sort belonging to the Duke class, but I don't think it would sustain itself much north of this. The Reine Hortense bears as well as anything I have, and is one of the largest of cherries. I hav'nt tested this thoroughly on any other than Morello stocks. On the stock above mentioned this variety should, in my opinion, be more largely planted. Of course I am speaking of this section of the State. Gov. Wood, on the same stock, has borne satisfactorily for many years. No rot has put in an appearance except in case of Belle Magnifique, and with this sort only for the past six or seven years. For twelve or fourteen years previously it was not affected in the least. My father has a Mazzard seedling about twenty years old, bearing a cherry black in color and about the size of the average of the common Morello sorts. The tree is hardy, and the fruit quite sweet and pleasant. Now and then a Mazzard proves entirely hardy.

Digitized by Google

In this portion of Iowa I should plant some of the Dukes and all of the Morellos on Mahaleb stocks. My reasons being that they stand straighter and more firmly, not blowing down, nor leaning to the northeast; the leaves will be larger and more numerous, and the fruit average a little finer one year with another; there will be no sprouts, and the average duration of life will be in favor of the trees on Mahaleb, by from five to eight years. This root is also much hardier than that of the Morello, and has never been killed by our dry hard freezing winters, even when a large proportion of the trees on the Morello roots have perished outright. It might be added that trees on either stock will bear equally well.

PLUMS

For the past two years have not been a profitable orchard crop as they were for the three previous year. Miner and Wild Goose bear well whenever we have plums in the thickets. The last named sort is short-lived.

Some years ago I made a collection of about one hundred varieties of our common wild plum, mainly from different portions of the northwest. Among these are, perhaps, six or eight sorts which are quite desirable for eating and cooking. Of course all are hardy, but the Weaver, so far, has proven to be a very sparse bearer, although the plum is quite a fair one, being very solid and a perfect freestone. Should the coming year be a fruitful one, I shall have an opportunity to learn much in regard to them.

STOCKS.

After testing about all the stocks on which the plums will grow, I find nothing perfectly hardy except the wild one, and on it many varieties are short-lived. After this comes the peach, which is hardier than Myrobolan, Horse-plum, and others used for this purpose. On this stock, however, many varieties don't bear, while Wild Goose grows too fast and breaks down. For the northwest, we very much need a hardy, free-growing plum, on which we may work the better varieties.

PEARS.

I am aware that deep water is now being reached, and, perhaps, the less one says the better he will be satisfied when through. Again, I am not sure that I didn't know more about pears ten years ago than I

Digitized by Google

do now. Nevertheless, I have not weakened in the least in the management of two small orchards and a number of scattered trees, in all about three hundred and fifty trees, including, doubtless, more varieties than I will have in ten years from this date. In the culture of the fruit, certain things figure largely, among which are: varieties, soil and subsoils, drainage, exposure, mulching, manuring, and pruning. In the way of soils, my preference is in favor of a white oak or clay soil, with open, porous subsoil. A high, northern inclination, fairly exposed to the north and northwest winds. Protection, in the way of wind-breaks, if near, should be on the south and southwest. Dwarfs should be judiciously mulched and manured, and always grown on the true Anger's Quince. In the cultivation of dwarfs, I have known good results to follow severe cutting back of new growth in fall, coupled with the planting of an evergreen close on the south or southwest side of each tree.

In regard to pear blight, as in the case of apple blight, very much depends on varieties. The Wagner apple and Transcendent crab will blight, while Ben Davis and Tetofsky do not. We often hear it said that manuring causes blight. I do not think it does, although wet soils and ill-advised manuring may render the effects of blight more destructive. In growing a Wagner and a Ben Davis side by side, manure or no manure, the former will blight while the latter will not. So the manure is not necessarily a cause of blight. Just so in the culture of the pear; some sorts blight infinitely worse than others. The great point, then, with the orchardist should be to plant those varieties which are least subject to this malady, although they may not be, in all cases, as good in quality as he could wish. Glout Morceau cannot be grown here; while Urbaniste blights but little, neither does it bear much, which latter peculiarity, by the way, might be considered objectionable. The Bartlett, unfortunately, is one of our blighting, tender sorts, and I believe has done much toward discouraging pear planting in Iowa. It has grown into a saying that the knowledge of the average man, in regard to this fruit, is included under two heads: Bartletts and pears. When he goes to the nursery, he invariably speaks of the Bartlett, and the nurseryman thinks it better to let him have it than to run the risk of telling him that there is anything better. So he goes home, and ultimately condemns all pears on account of the way his Bartletts act.

We have one or two seedlings which have passed the ordeal here for about twenty years, although of but tolerable quality. Another sort,

Digitized by Google

obtained from a neighboring county, where it has stood the test of almost thirty years, I value quite highly. Some of our friends in Illinois think they have struck oil in this direction, and it is to be hoped they have.

I will say for the Birkett, that thus far it has not blighted with me, although it may be merely procrastinating with me until a more "convenient season." Some of my trees bore a few this summer, but as it was a poor year for fair specimens, I would not judge of it. It grows readily enough on the quince. The Lawrence is to quite an extent free from blight, but on the quince is a very poor bearer. The same may be said of the Duchess of Angouleme. The Beurre Hardy, Doyenne Robin, Seckel, and Tyson, have given considerable satisfaction here; while Flemish Beauty, Louise Bonne de Jersey, and Buffam, are desirable.

I have tried many of the leading sorts, on different stocks, like Mountain ash, Shad Bush, or Juneberry, and many varieties of thorn, both native and foreign, but find them inclined to be short-lived; yet, on the thorn I have had many fine crops. In the way of stocks, I prefer imported pear seedlings or Anger's quince.

But, to get down to the great practical point of this matter, I think if a man is favorably situated, and will plant those varieties which do best in his neighborhood, watch them carefully during the blighting season, and has the courage to cut back almost recklessly when the blight appears, and replant when a tree is lost, he will raise pears in central Iowa with a considerable degree of success. I find this the case almost universally, and those who have been at it the longest talk the least about being discouraged, and the most about what is best to plant.

PROPAGATION AND MANAGEMENT OF THE PEAR.

BY A. J. HAVILAND, FORT DODGE.

The propagation and management of the pear, as it has been practiced for upwards of fifty years, has reduced the vitality of our trees to the lowest point that can be reached and have them live in the most

Digitized by Google

favorable localities. We must adopt a different course before we can expect to realize the most important thing in pear culture—a good tree. When we can grow good trees that will endure our prairie soil and climatic changes, we shall have no trouble in raising in abundance, fruit that will compare favorably with our best specimens.

Our great trouble in these telegraph and railroad times is, we cannot afford to wait. We must have a dwarf, or something that will come into bearing in a few years, and, so we go on from year to year trying this and that stock without any progress.

I think the sooner we discard the idea of purchasing eastern grown trees worked on the Quince and French pear stocks, the better it will be for our future, as they have been thoroughly tested and have almost universally failed in a few years; only those in some sheltered favorable location having lived.

I have no new theory to advance, but think we must go back to first principles and start again with the seed.

We have been working the tree down long enough and some plan must be adopted to work it up, if we ever expect to raise pears in Iowa.

Some system similar to that adopted by Mr. Gideon, of Excelsior, Minnesota, in his treatment of the apple cannot fail to give us satisfactory results when applied to the pear. Grafting alternate limbs of our best hardy seedlings with our best hardy varieties, would, as soon as they commence bearing, pollenize the seedling flowers, and give us a good start in a short time, with seed to experiment with.

Our stocks for nursery work would be greatly improved if western nurserymen would have their seeds gathered from American seedlings or the wild pear of Northen Europe, discarding the French seed altogether; and in transplanting, always giving the seedlings the benefit of all the tap-root possible. I am satisfied that our best trees have been grown where the tap-root has never been disturbed. The pear requires the same management in the orchard as the apple; setting about three inches deeper than it stood in nursery, leaving the earth concave about the tree, filling in a little at each cultivation through the season, and before freezing weather raise a mound about the tree. In ploughing always turn the furrow to the trees and in a direction to allow the surface water to be carried off in the depressions that will soon be formed by yearly cultivation with the plough.

I prune up to four feet; pruning the last of May or first of June.

A judicious pruning annually, with the pocket-knife, while the tree is small will remove the necessity of using a saw in after years.

Digitized by Google

An application of soft soap the last of May to the trunk and branches will assist in keeping off the borers, promote the growth, and improve the appearance of the tree.

DISCUSSION ON REPORT.

Mr. Foster: We have many good points in Mr. Haviland's paper. The dwarf pear trees fail in their roots with us. The Mahaleb cherry also kills badly with us when used as a stock. The Mazzard as a stock also is defective in our soil. I am inclined to think there is something in the idea of a tree having more inherent vitality where its original tap-root has never been cut or broken. I planted a few years ago a small lot of seed taken from pears grown in Indiana, which grew well and made healthy vigorous seedlings, but these have blighted. I am inclined to go back on the pear and cherry and fill their places by planting more Turner raspberry.

Mr. Hart: Surely these are days of changes and sudden conversions. Six or eight years ago Mr. Foster talked encouragingly of success in growing the pear, especially when planted among the evergreens; now he is ready to fill their place with the raspberry. I have some faith yet in the pears if we get started on the right road. We have one pear tree near Mt. Vernon, planted thirty-five years ago, which is still hale and hearty. This tree has borne many fine crops of fruit. I believe we will yet have varieties of the pear fully able to brave our climate in all its varied moods.

Mr. Shaw: I still have an abiding faith in the pear. I have a strong clay soil. I have about five hundred trees largely of Sheldon, Buffum, and Seckel. I have but little show of blight. We have old trees in Decatur county, set by the Mormons in 1850. These trees bear about every year.

Mr. Patten: I would advise Mr. Hart to plant the seeds of the old tree near his place. Central Iowa is just the place for work of this kind. Some have the impression that we should originate trees for the north, *at the north*. I believe it is a thing of *descent*, and *race*, very much as it is with the animals. The idea is no doubt right that to secure an iron-clad tree the mother tree in the cross must be a strict iron-clad, irrespective to some extent of the character of its fruit. But the variety used in fertilizing must bear choice fruit. These conditions can be best secured in the apple where plenty of choice late keeping fruit is produced. So in the case of crosses of the Miner and native plum with the European sorts; the improvement of primitive

Digitized by Google

forms of the pear, etc. Mr. Haviland's suggestions as to seedling production are valuable.

Mr. Case: I have planted pear seeds for a number of years past. In rare cases the seed reverts to primitive forms quite unlike our cultivated varieties. I have one with very light colored bark, queer foliage, and very tender twigs. I top-worked this on other stocks. The scions assume very upright habit of growth. I have seen no tendency to blight in this seedling.

Mr. Guffin: I am getting about discouraged with the pear. I am each year more and more amazed when I go to the State Fair. The show is each year growing smaller and beautifully less. I tried the mingling of the evergreens and the pears. I saw no benefit in the way of saving them from the blight. Yet the pear seems as hardy as the apple, if we could only save it from the blight. White Doyenne has proven the best with me in productiveness and health. I have twenty old trees. But the fruit sometimes cracks. The Flemish Beauty blights badly.

Mr. Wright: I would ask Mr. Haviland why he objects to the use of the Mahaleb as a stock for the cherry?

Mr. Haviland: The Early Richmond on the Mahaleb has not fruited well with us. I prefer to top-work on the Black Morello, about two feet from the ground.

Mr. Wright: I collar-graft on Morello roots. I have one thousand trees in orchard, and I am glad to report that, so far, they have been free from the mildew of the leaf so prevalent and injurious in the eastern portions of the State.

Mr. Graves: I would like to know the best method of growing seedling stocks of the cherry. I have so far only used the sprouts.

Mr. Haviland: I have used seedlings and suckers for grafting. I have had little difference in success in grafting them.

Mr. Patten: There is distributed in the vicinity of Mason City, a variety of Morello that, so far as I know, bears no fruit; yet they have trees six to eight inches in diameter. It is very light in color of bark, and very hardy. I have noticed in no case any injury in the forks. It seem likely to be valuable for stocks.

Mr. Haviland: The Morello I used is from Bureau county, Illinois. I think it is the true Black Morello, and bears fruit of very fair quality.

Mr. Trueblood: With me the English Morello has not done well

Digitized by Google

on the Morello stock either when root or top-grafted. I top-worked English Morello on two hundred trees and the scions mostly failed.

Mr. Keller: I have had good success in growing seedlings from Morello pits. I dug a hole eight inches deep and put down a layer of sand, then a layer of seed, and let the seeds freeze during the winter. I planted as early as the ground could be worked.

Mr. Watrous: I have found no trouble in growing the seedlings if the pits are but little dried before putting them in the sand. The pits of the common Morello grow best.

The report of the committee on the origination of new fruits by crossing was now read.

HYBRIDIZING AND CROSSING OF FRUITS.

BY G. P. PEFFER, PEWAUKEE, WIS.

Mr. President and members of the Iowa State Horticultural Society —I do not know that I have made any recent observations or experiments of importance since I contributed a report on this topic to our State society in 1872–3, and to the American Pomological Society in 1875. Yet I can add to what I then said that further experience confirms the statement I then made. Especially is this true of the idea I then expressed as to the mother tree or plant controlling style of the fruit and habits of growth of the tree, and the *staminate* plant, the character and season of the fruit to a greater or less extent. We have fruited for the first time the past season a hybrid produced from the seed of Duchess fertilized by a winter crab seedling that had fruited since 1871. This crab was a cross of the little yellow Siberian and Green Everlasting. The cross of this winter crab on the Duchess presents a perfect example of a quite certain law of crossing. The shape of fruit, and outside form are like Duchess, but the flavor, flesh, and texture are all changed, and are an improvement. The fruit of this new hybrid is in good condition now (November 23).

Digitized by Google

Again, I might instance the Gibb crab. This is a hybrid of the small yellow Siberian fertilized by Fall Greening. The essential characters of both parents in the Gibb are so evident that no one can dispute them. Bellflower crab and many other cases exemplify the law.

The conclusions which I draw from my long experience and observation are few and simple: If we wish to produce new varieties, that beyond doubt will stand our climate, we must select for the mother tree the hardiest varieties that can be found, and the variety we use for fertilizing should combine the requisites of a good tree, and a choice quality of fruit, as far as obtainable in one variety. Anyone making himself familiar with the natural working of reproduction of fruits, grains, or flowering plants can, by the application of judicious skill, and methodic management, produce about anything he wishes. It only takes some time, patience, and care to produce results which are astonishing.

By this plan we can get some valuable results from the large fine Russian summer varieties of the apple. All experience is in favor of producing from them in the near future varieties of great value by using for fertilizing the strictly isolated anthers of the Russians, with pollen from our best fruits which are less hardy. If our trees were thus scientifically produced I believe all this hue and cry about winter-killing would soon cease. We often hear the remark, "It takes too long to get results in this way." I have not found trees so produced longer in coming into bearing than the root-grafted trees.

I believe the time will come when trees will be grown from seed which will reproduce the parent variety. Isolation of flowers from foreign pollen is all that is necessary.

DISCUSSION ON REPORT.

J. L. Budd: Mr. Peffer has originated from seed, crossed in methodic manner, several choice varieties of the apple. Clark's Orange and Pewaukee are the best known of these, both of which are seedlings of the Duchess. Peffer's No. 1 is another Duchess seedling which seems an iron-clad. The fruit seems quite a late keeper, as I have just received a card from Mr. Peffer saying he has forwarded a specimen of the fruit. We have growing on the College Farm some scions of a seedling pear which Mr. Peffer calls One-third, from the fact that it is the third generation from seeds originally sown by him in Wisconsin. It seems as hardy as Duchess, and shows no sign of leaf blister or blight as yet.

Digitized by Google

The discussion on the cherry was now resumed by a question relative to the Early Richmond on its own roots.

Mr. Hilton: We have Early Richmond trees on their own roots which are twenty-five years old. They bear well, but do not come into bearing as early as when grafted.

Mr. Smith: A friend has some trees on their own roots which I visited when in fruit. These trees bear well.

J. L. Budd: I have grown Early and Late Richmond on their own roots. They do not bear as young, or as regularly as when worked on the Morello stock.

Dr. Kulp: We have a variety of the cherry which seems desirable for canning, called the "Silver Thorn."

Mr. Foster: This variety came to our county at an early day from Eastern Pennsylvania. It is merely an improvement on the Black Morello. The fruit is larger, and some better.

Reports on nursery management were now read in whole or in part.

PROPAGATION OF THE APPLE.

BY C. L. WATROUS, DES MOINES.

In preparing this paper I have been in some doubt what to say. Any practical nurseryman could write a small volume on the subject of growing sound, thrifty, handsome apple trees, fit for market at three years from the graft, and still not touch all the points forced upon his attention during a series of busy years. But such a paper would be very tedious to an audience, and too bulky for our annual report. I therefore determined to confine myself to a series of hints upon some points whereon beginners might most likely fall into error, and a few whereon practical men might differ. That some points will provoke discussion and dissent I expect, but discussion may lead us to the light we all seek.

Digitized by Google

STOCKS AND SCIONS.

Whoever would grow sound healthy apple trees should see to it first that he has sound healthy stocks, or seedlings, and scions of sound healthy young wood. Both should be properly packed away in the cellar before any severe freezing in winter. I dislike to have seedlings shipped about on railroads after freezing weather.

Roots should be well packed in sand or sandy soil, rather too dry than too moist. Scions are best kept in boxes in chaff, dry leaves, or well wrapped in paper. Anything that keeps the air away is enough in a proper cellar. A little dryness in both roots and scions before grafting seems no disadvantage; then, if packed in material slightly damper after grafting a healthy callous is sure to be formed by planting time. Everything in the cellar should be often examined, and if too moist, unpacked, aired, and repacked in dryer material. The reverse must be done if already too dry. If roots are too moist they will present a watery appearance when cut, and the line between bark and wood may be darker than the rest. If this increases they need attention: remove roots from sand, air well, and repack in dryer material. There is very little danger of dryness so long as they are well covered and are in thin layers.

GRAFTING.

In this work it pays to provide good materials and tools, and a well lighted, warm work-room. As to knives, I have succeeded best with the best quality of short-bladed shoe knives. They are cheap, light, and as apt to contain good material as any others. We use No. 18 or No. 20 knitting-cotton for winding the joints. For wax buy the best quality of rosin, and use about six pounds to one quart of linseed oil; the exact ratio cannot be determined without trial, as rosins vary in hardness. Melt the ingredients together in an iron kettle, and when boiling, wax small quantities of thread and try them. When ready for use the thread should adhere when crossed on the graft in winding and pressed with the fingers. The least wax on the thread, compatible with adhesion, the better. I prefer to use a short root and long scion, say a three inch root and a six inch scion. With our drying winds and light, porous soils, the eastern plan of a three inch root and three inch scion has not given satisfaction.

In splice-grafting (which is best here) a slope three times as long as the diameter of root or scion, with a rather shallow tongue, so that

Digitized by Google

when fitted together a close joint is formed, gives good satisfaction. In winding, at least five turns must be made, two at each end and one in passing from one end to the other. If the ends of the joints are well secured the middle will take care of itself. I have had the best success with grafts packed in bulk in sand. Use shallow boxes, eight inches deep, place one at an angle of 45 degrees, fill the lower corner with sand, place thereon an inch in depth of grafts, sprinkle over and among them sand till covered, press down firmly and so continue till full. So packed I have never known grafts to suffer. The sand should be only slightly moist. Of course each variety is labeled, and a careful record kept in the graft book.

SELECTION OF GROUND, PREPARATION AND PLANTING.

Almost any well-drained prairie soil that will produce good corn will grow good apple trees; but beware of too much sand. Trees are less safe from winter-killing on very sandy soils. Clay is better. Plow with three heavy horses at least twelve inches deep, if possible. Harrow thoroughly, and pass over with a clod-crusher to even the surface. Plant by a line, in rows three feet eight inches apart, and six or eight inches apart in the rows. More room might be desirable but is not profitable. We plant with a flat dibble with a twelve inch blade two inches wide at handle, tapering a little toward the point. Place the top bud even with surface of soil, and firm the soil well in planting. The workman passes back along his row with a heavy foot on either side pressing again after planting.

CULTIVATION

Should commence with hoe and cultivator as soon as grafts are well started, and cannot be too industriously kept up till July 1st. At the last cultivation the soil should be thrown well to the trees. About July 15th we sow one bushel of buckwheat to the acre, and cover with a light cultivator, still throwing some earth to the trees. They are then ready for winter.

PRUNING AND SUBSEQUENT TREATMENT.

In March, next spring, go over the young trees with a sharp knife; remove all forks. If the trees are uninjured by the winter and have made a fair growth this is all they should receive till after their first growth is ended, about July first. Then go over and prune up to

Digitized by Google

suitable hight for head. I would allow no apple tree to form a head less than two feet, and from that to three and a-half feet for spreading habit. I think we have made a great mistake in pruning apple trees as if they were shrubs instead of trees.

But if any are badly injured by winter, or from any other cause have made a dwarfish or ill-shaped growth, it is best to cut them to the ground. Save the best sprout, keep off all others, and at three years you may have a handsome tree. This plan is much better than trying to make a good tree out of a sickly stub. Branchless trees should be topped at the proper hight. One year will make a handsome head, but this is best done in early spring. The third spring, or when the trees are two years old, nearly all will or should be large enough to be pruned to the proper hight for heading out. This is best done in March or at least long enough before the sap rises for the wounds to become dry. Trees are checked less in growth by pruning then than at any other time. After the first growth is finished, say about July first, a second pruning is made, taking off water-sprouts from trunks and shortening straggling branches where necessary. The course of pruning is pursued at three and four years with any trees too small from having been cut back, to have been put into proper shape. At the end of four years, all trees should be marketed or burned; as a rule it does not pay to keep a quantity of overgrown stock in the nursery. Cultivation should be early and thorough as long as trees remain in nursery. Enough buckwheat will probably grow from seed of previous seasons to afford excellent winter protection.

One word about buckwheat in young nurseries. I have tried clover culture. I have tried allowing weeds to grow late in the season. I have sowed oats and have sowed buckwheat. I will take the buckwheat and hope others will use what gives them most satisfaction.

Of course these are only a very few of the things that might be said and perhaps ought to be, but it is enough to open the subject for discussion.

Digitized by Google

FRUIT, SHRUBS, AND PLANTS, GROWN FROM CUTTINGS.

HON. GEO. H. WRIGHT, SIOUX CITY.

Of all the operations of nurseryman or florist, the one above all others in importance is the propagation of plants by cuttings. It is the source of the greatest profit, and should be understood by all. A careful operator, though he be an amateur, who carefully applies the knowledge gained by study, and a never flagging energy to succeed in what he undertakes, will soon discover that many of the small fruits, and nearly all the hardy flowering shrubs and ornamental trees, may be grown from cuttings.

There are two classes of cuttings which a florist becomes familiar with in the course of his practice: hard or ripe wood cuttings and green wood cuttings.

The first thing to be considered is the time and method of taking the cuttings and the best manner of dealing with them after securing them.

The proper time to gather ripe wood cuttings is in the fall, after two or three heavy frosts. I will commence with the grape: Take all the ripe wood of the year's growth just past; cut into pieces about nine inches long, or with two or three eyes to each piece; tie into bunches of twenty-five or fifty, the buds all one way; after securing all the wood you require, dig a trench deep enough so that you can stand the bunches of cuttings on end, *top down*, covering all with well pulverized dirt to the depth of three inches over the butts; after the ground is frozen, cover the entire surface for three feet each side of the trench with coarse litter. There let the cuttings remain until the ground gets warm in the spring, say until May 15th, when you will find the cuttings have all formed granulations on the butt ends. The time has now come to set out the cuttings. I find partial glass culture the best. Select your location where the soil is warm and dry; spade at least one foot in depth and two feet in width, pulverize the soil fine as you proceed with the spading; select straight boards six inches wide, place them edgewise, seven inches apart on the inside, parallel over the center of the spaded row; secure them in place with small stakes; nail

Digitized by Google

lath on the outside of the boards, so that the upper edge of the lath will reach half the width above the upper edge of the boards. Put in sawdust between the boards to the depth of two inches; place eight-inch window glass on top of the boards and inside the lath. The lath will keep the glass in place; place the ends of the glass together, "but do not lap them." You are now prepared to put in your cuttings, at about an angle of fifty degrees from the ground; place the cuttings about one inch apart; thrust the cuttings into the ground so that the top bud will be even with the top of the ground; fill both sides of the box or propagating bed the same way; leave the glass on until first to middle of August. Follow the above rules, and ninety-five per cent of the cuttings will grow, even though the weather should be unusually dry.

The above rules will apply to all of the Spireas, Snowballs, Flowering Almonds, Deutzias, Hydrangeas, Tree honeysuckles, Syringa, Weigelia Rosea, Mountain ash, gooseberries, currants, and in fact you will be surprised to see the success to be met with in this method of growing plants from hard wood cuttings.

The second class of cuttings are green wood. The operation of growing plants from green wood cuttings requires a propagating house exclusively for the purpose. The first thing to be considered is the propagating bed. This should be directly over the flue or hot water pipes in the house. Prepare the bed so that it will hold three inches of sand. This sand should be very fine and entirely free from all dirt or soil. Pack the sand solid on the bed.

We will first consider the Rose cuttings, as the conditions are nearly identical with about all the flowering shrubs. The rose, to root well in a sand bed from cuttings, must be grown under glass. The proper condition of the slip or cutting at the time it is inserted in the sand is of great importance, a condition which is so little understood even among florists. It is generally supposed that it is necessary to make the cutting just at the joint or just below; the practice of this system leads to most of the failures, not that the cutting at or near the joint hinders or assists the formation of the root, but the wood has often become hard at the joint, when a short distance either way the condition of the wood is found to be right. The best rule for the amateur to adopt in propagating all kinds of soft wooded plants is to bend the cutting; if it breaks or snaps it is generally in the right condition. Should the cutting bend and not break, then it is too hard. The cut-

Digitized by Google

tings will take root even in the latter condition, but it will root more slowly and the plant will not be so vigorous as that made from one in the proper condition.

In propagating roses, daphnes, and spireas, the best condition can be nearly determined by taking the cutting about the time the buds begin to develop; place the cutting, after you have been very careful to see that the lower end has been smoothly cut, in the sand bed, keep the sand moist—not wet, and in about fifteen days the plant has thrown out small tender white roots. Do not allow the cutting to remain in the cutting-bed after it has taken root. In removing the plant from the bed and placing it in pot, the greatest care must be observed so as not to break off or injure the roots, and the same care should be taken to prevent the young plants from getting dry during the first month after potting; also, great care should be exercised in preventing too much heat from the sun, and any draft of air or wind, as it is liable to mildew the leaf of the rose, and thereby increase the risk of loss of the plants.

By observing the above rules, you may grow all the varieties and species of trees, plants and shrubs mentioned in the first class of cuttings, and very many others. The large family of geraniums, fuchsias, bouvardias, and heliotrope; the large variety of succulent plants, and in fact the hundreds of different plants usually found in our green-houses.

By a little timely labor, you may decorate your homes, cause your wife to smile her welcome, your children to love your return home from your daily toil, and yourself to know that you have discharged your duty to your family, your neighbor, yourself, and your God.

DISCUSSION ON REPORT.

Mr. Wright: In propagating cuttings by the plan of starting the roots first by glass heat, the slight covering of old sawdust is used merely to retain the moisture. If the weather be very dry the small space covered by the glass should be kept moist by occasional watering.

Mr. Haviland: In our part of the State the gypsum splits into very thin flakes, which may be cut into any desired shape. Why would not these blocks answer better than sawdust for keeping the soil moist over the cuttings while rooting?

J. L. Budd: The soil needs to be kept moist under the glass, but

Digitized by Google

not cool. The object of the glass is to start growth of roots before the tops exposed to the air begin to push.

Mr. Haviland: I intend to try next year the blocks of gypsum with a hole through the centre to surround strawberry plants. They will keep the soil cool and the berries clean. The thin plates will last for a year or two, and when they crumble they will fertilize the ground.

The committee on President's address and Secretary's report were now ready to report.

REPORT OF COMMITTE ON PRESIDENT'S ADDRESS AND SECRETARY'S REPORT.

Your committee, to whom was referred the President's address and Secretary's report, beg leave to report that they have had the same under consideration, and recommend:

First. That the Secretary be authorized to purchase a seal for the Society.

Second. That the President and Secretary be a committee to prepare for publication in the annual report a descriptive catalogue of fruits, plants and trees recommended by the Society, which shall also embrace such other reliable varieties as have been proven and tested in the State, and others deemed by the committee worthy of a place in the catalogue.

Third. That C. L. Watrous, J. L. Budd, H. C. Raymond, C. G. Patten and Henry Strohm, be a committee to distribute the scions of the new varieties of fruits, evergreens, plants and shrubs.

Fourth. That provision be made for the making of a summer exhibition of fruits at the time of holding the annual State Fair.

Fifth. That the appropriation heretofore made for the purchase and importation of foreign scions, seeds and plants be continued; said scions, seeds and plants to be propagated at the Agricultural College and from there be first distributed, when propagated, to the officers and members of this Society.

W. H. LATHROP,
C. G. PATTEN,
SUEL FOSTER,
Committee.

Digitized by Google

After annexing as an amendment to the third section that the rules governing this distribution shall be made by the committee, the report was unanimously adopted.

DISCUSSION ON SCION AND TREE DISTRIBUTION.

Mr. Lathrop: Some care will be needed in the wide distribution of the new varieties of the apple and other fruits from our own country and Europe. But experimental stations should be started in different parts of the State by those having the requisite skill and interest in the work. We may reasonably expect that the Russian varieties will not do equally well on all soils, and in all parts of our great State. A somewhat extended trial will soon sift out the real treasures included in the importation.

Mr. Brackett: This Society can only endorse varieties known to be decided acquisitions to our present list. It is true we should try these varieties in varied situations, but the dissemination should be confined to a committee, and by no means be indiscriminate and general.

J. L. Budd: It must not be supposed that a commercial nursery will be started on the College Farm. While it is true that we have now on hand a number of thousands of one year old Russian apple trees, they are made up of four or five hundred varieties. As there are but few trees of any one variety, except of those about which we at this time really know something as to hardiness, habits of growth, and character of fruit, it is quite evident that there can be no present wide and extended distribution. Yet I will say that little damage would result if a thousand or more trees of each variety were distributed for trial in every county of the State. We have every reason to believe that they will all prove hardy, and that they will bear fruit of good size, appearance, and quality, almost without exception. But it will be well to place the first scions distributed of the apples and pears in the hands of competent persons selected by a committee of this Society. In addition to the varieties from Northern Europe and Asia, we have trees in nursery of many promising varieties from northern sections of our own country, which are not yet common in our nurseries. These will be distributed for trial in various parts of the State. Adjourned to two o'clock.

Digitized by Google

THURSDAY AFTERNOON SESSION.

Upon convening at hour set at adjournment, Col. Scott introduced the following resolution:

Resolved, That this Society warmly endorses the ideas recommended by the Governor in his biennial message relative to fostering our productive industries, and that a committee be appointed to present these views before the General Assembly through the Committee on Agriculture.

Resolution adopted.

Col. Scott also offered the following:

Resolved, That in answer to the invitation extended to this Society by the Fine Stock Breeders' Association and Agricultural College to join with them in holding institutes for the elevation of our productive interests, that we cordially accept the same, and hereby appoint as our representative committee Messrs. Brackett, Foster and Budd.

Motion supported and unanimously adopted.

Col. Brackett now exhibited seedling plants of the Hardy catalpa, now called Speciosa, and of two varieties from Japan.

Report of Director of Third district was now read.

REPORT OF DIRECTOR OF THIRD DISTRICT.

BY H. C. RAYMOND, COUNCIL BLUFFS.

The year opened very auspiciously for the horticulturist, with the exception that the soil was quite dry. There was nothing to mar the fine prospects of the fruit-grower. A few light falls of snow, together with a winter only moderately severe, saved our trees and plants from what threatened to cause very severe losses by root killing. However, much damage was done especially to cherry trees and grape vines. A large cherry orchard in Mills county was killed entirely. Other cherry orchards over a wide range of territory suffered to a greater or less

Digitized by Google

degree. The Late Richmond stood the trial better than Early Richmond or English Morello. Trees worked on Mahaleb or Morello stock suffered alike. The trees of Late Richmond in this vicinity are all on their own root.

Vineyards in a few cases were ruined, while the greater part were somewhat injured; a few escaped entirely. I am satisfied that there is no tree or plant root that can remain alive under a combination of circumstances that is liable to occur any winter, especially on the western slope. These circumstances are, a very dry soil, absence of snow and very hard freezing. I know of but one way to prevent great losses at such times, which is to mulch heavily and thoroughly. This plan is practicable and should be borne in mind, always remembering that those trees or plants having fibrous roots or roots near the surface, should receive the first attention.

The swelling fruit-buds in spring yet promised a bountiful harvest; but just as the opening buds of apple, pear, plum, and early blooming cherries were showing their color most of them withered and fell; some bloomed, but seemed to have but little vitality, and produced a small quantity of fruit. Some apple orchards in my district bore half a crop. Cherries, pears, and plums were almost a total failure. I ascribe this loss of fruit principally to the depredations of an insect heretofore unnoticed by me, and as the damage was done during the hurry of tree selling, I merely noticed the insect as being very plenty about the apple trees. Sometimes hundreds of them would fly from one tree when it was shaken. This insect is known by the name of *Capsus oblineatus*, or the tarnished plant bug; looks similar to the chinch bug, is a little larger and broader in proportion to its length. Reports come to me of this insect being noticed as doing damage in nearly every county in my district. Being related to the ever-present chinch bug we should be prepared at all times to fight this enemy.

The following account of this insect is from Mr. M. Pugsley, Harrison county: "Our acquaintance with this insect began eight years ago. A field of potatoes looked badly alongside some willows, and upon examination we found this insect to be the cause. We next observed that this insect destroyed the bloom of the Dwarf Mountain Juneberry. We find them to be increasing in numbers. During the spring of 1877 we found them destroying the flowers of early-blooming crabs, but last spring they fed on all tender growths so far as I made observation, taking crabs and apples alike. They sucked the juice from my lilacs, dicentras, and from the buds of what would have pro-

Digitized by Google

duced a thousand peony flowers, destroying all. About December 20 I found one in the house. I made him a prisoner, pressed him in 'Downing's Fruits and Fruit Trees of America,' and now send him to you for judgment. They fly so readily that it takes quick work to catch them on a warm day; they also hide by moving to the opposite side of a limb. There is much complaint of late years about crabs not bearing fruit, and of blossoms of crab and apple falling from the tree at or before time of blooming. I think observation will show that this insect is the principal cause of this sort of trouble. The insect belongs to the same order as the chinch bug and soldier bug; action, form, manner of taking food, and odor indicate this."

Soon after this insect had destroyed the early bloom a heavy frost came and people generally considered the frost responsible for the loss of fruit.

Concord grapes produced about one-half crop in the aggregate. Some vineyards produced a full crop. Frost while in bloom, and winter root-killing, reduced the yield in others. Warm and sheltered situations best suited to the growth and ripening of the grape are most subject to visitations of late spring frosts. Vineyards on elevated, exposed situations have not failed to bear an annual crop for the past fifteen years. Owing to the scarcity of other fruit during the past season grapes found a quick market at four to five cents per pound wholesale at Council Bluffs. The grape-eating public seemed to be well satisfied with the quality of the Concord, and continually call for more of them, while children too young to talk cry for them.

Strawberries were injured by the winter, but made brave efforts to recuperate. A frost destroyed the first good setting of blows, and then a drought put an end to our expectations. I would make favorable mention of the Capt. Jack as doing exceedingly well for me, in comparison to many other sorts.

Currants, gooseberries, raspberries, and blackberries were almost a failure in the northern part of the district, but bore a partial crop in the southern part.

The call for fruit trees for planting was moderately brisk. Very little timber is being planted. The work is be to shifted to the shoulders of the next generation. Owing to the dry weather during May and June newly-planted trees, and especially evergreens, suffered to a considerable extent. Fruit trees that had been wintered in cellars stood the test and wintered well. Most planters do not understand why a tree newly planted does not grow as surely during a dry spring

Digitized by Google

as during a favorable spring if they attend to watering the tree. Let us investigate and explain the reason. We will take for example a newly planted evergreen, a tree in full foliage. We have but little idea of the amount of moisture that is constantly being evaporated from this tree when the air is dry. We know that continued drouth brings with it a very dry atmosphere. There is a continual draft upon the life of the tree through the constant evaporation of the moisture, and though we may deluge the roots with water they in their mutilated condition (generally having only one-half to one-tenth their normal amount), cannot supply sufficient moisture to support life. On the other hand, if we have seasonable rains the soil and and all vegetation is throwing off a sufficient amount of moisture to keep the air in a humid condition, thereby relieving the tree of that excessive draft that is caused by an arid atmosphere. We may, by enclosing a tree and maintaining a constantly humid atmosphere, preserve life for several months, though the tree have no roots at all. We often notice the drooping and curling corn blades when suffering by drought; during the day they wither, by night they recover their usual freshness. The corn roots extract as much or more moisture from the earth during the day as at night, but during the day the evaporation is rapid and the roots are not able to replace the moisture; at night evaporation ceases and the roots are able to repair the waste. By shading new planted trees we cool the surrounding air and thus lessen evaporation. Sprinkling the tops at evening is also beneficial.

The drought of the present season did not seriously affect established trees, and nursery stock and trees generally made a very fair growth.

Newly planted stock and seedlings made a moderate growth. All ripened up well and have entered the winter in good condition. Late fall rains have moistened the soil to such a degree that we think the roots of the trees safe for the winter. The prospects now for fruit the coming season are very flattering.

Blight has not been so severe as during some former years, yet has attacked some orchards not before affected. I would recommend a wash composed of lime, sulphur, soap, carbolic acid, and water to prevent injury by borers, and it will have a tendency at least to prevent blight.

The business of tree planting is yet carried on in a hap-hazard sort of way; results are consequently unsatisfactory. With the increasing population of this district tree-peddlars are multiplying in number and popularity, but not advancing in honesty. I would recommend to

Digitized by Google

your attention the urgent need of an immediate organization of a horticultural branch of home missions for their especial benefit.

As we take a retrospective view of the past year the horticulturist would feel quite discouraged were it not for the fact that the Iowa fruit-grower has been obliged to subsist so largely on a diet of faith and hope that he is really getting used to it. We must consider that our is, to a very great degree, a labor of love, and we must be content with a little money, laboring on manfully, cheerfully, hopefully, thinking all the time how much more favored are we than the poor Laplander or the Esquimaux.

ANNUAL REPORT OF THE SECOND DISTRICT.

BY GEORGE W. SHAW, GARDEN GROVE.

The winter of 1878 and 1879 was very hard on fruit trees and vines.

In the second district, at Garden Grove, in Decatur county, at sunrise, January 3d, 1879, the mercury stood twenty-five degrees below zero.

April 20th—trees almost as bare as at midsummer.

May 6th—a white frost, mercury twenty-eight degrees above zero.

Apples—Not more than one-fifth the crop of 1876. Among those that bore best were the Red Astrachan, Red June, Benoni, Maiden's Blush, Kirkbridge White, Rambo, Dyer, Fulton, Ben Davis, Northern Spy, and Rawle's Janet.

Never were apples more beautiful; with scarcely a worm to mar them, nearly every specimen was smooth and perfect. Average market price, $1.00 to $1.50 per bushel.

H. C. Raymond tells my story better than I can, when he says:

"From the experience and observation of the past, I am more than ever convinced that the fruit grower should not depend on one or two kinds of fruit for his income; but plant every variety that succeeds in this latitude; for how often it is, that certain varieties of fruit fail to bring the expected returns." It is also true, that unless we grow our

Digitized by Google

own fruit, we have as a general thing but very little consumed in our families.

The other fruits, except the strawberry, nearly a failure so far as heard from, in the second district; grapes not one-fifth of a crop; many thousand May cherry trees killed, root and branch. The winter of 1878 and 1879 has certainly been harder on the cherry than any winter since 1856 and 1857; nearly every tree of this variety, more or less injured by climatic causes. The Plum Stone Morello and English Morello, seem entirely uninjured, yet failed to bear.

The Strawberry—Gave the most bounteous yield ever known in the district as far as reported from; very many of farmers have their strawberry bed, mostly Wilson's Albany, and Downer's Prolific; the consequence was an abundant supply of this delicious fruit for every meal in the day during their season.

What would seem an unmixed evil has proved of advantage to the fruit grower; shortening in the other crops and thus compelling him to depend on the strawberry for a supply.

Thousands of strawberry plantations will be made so as to have a sure thing in the fruit line, and not have to depend on the grocer for wormy, dried fruit.

The Pear—Crop nearly a failure—but little blight. What is strange, the Morman pear trees on Captain J. D. Brown's farm (three varieties), bore their usual large crop, though not of the best quality, yet equal to the Buffum pear. The scions could probably be had for the trouble of cutting, and if they would grow trees equal to the originals, they would surely be worth many thousand dollars to the State.

H. R. Teller writes me that the Ben Davis and Willow Twig, ripened their fruit prematurely, and that early winter found them mellow and fit to use.

This is my experience, though for the first time in twenty years.

With their other good qualities, we can afford to have them mellow in December, once in twenty years.

Rawle's Janet seems to be the stand-by; never did it do better than the past year in most of the counties of the second district; true to its Hoosier name (never fail) for twenty-five years in parts of Iowa, it has borne each year more or less.

The reports of members of committees on Floriculture were read in whole or in part.

Digitized by Google

GREEN-HOUSE MANAGEMENT.

BY JOSEPH BANCROFT, CEDAR FALLS,

Mr. President—Of all the operations of the florist, the one above all others in importance, is the propagation of plants by cuttings. I will say right here, there is no branch of horticulture I love so well as propagation by cuttings.

A cutting does not always consist of a part of a branch of a plant. A few plants, such as Rex Begonias, Pepperonias, Gloxineas, and some others, are propagated more easily by a leaf than by a stem. But they require more bottom heat. I find they root very easy at a temperature of 70 degrees, bottom heat, indicated by a thermometer plunged in the sand of the propagating bench. Again, the Bouvardias, Anemone, Japonicas, Pyrus Japonica, Calycanthus, and others, are very slowly increased by cuttings and shoots. While by cuttings of the roots, they are propagated with ease. The roots of such plants are set with latent buds.

I take the roots, wash thoroughly, discarding all that show any sign of disease, and cut in lengths of one-half to one inch long, scatter them on the cutting bench and cover with one-fourth inch of sand. If a plant is propagated with difficulty by cuttings we usually find it increases freely some other way. Such plants are generally abundantly multiplied by seed. I find that all plants, with very few exceptions, root freely from slips taken from the young wood—that is, the unripened growth that a plant has made.

The proper condition of the cutting at the time it is inserted in the sand of the cutting bench, is of great importance—a condition which is not fully understood even by florists.

I find in propagating all soft-wooded plants, as a rule, if the cutting will snap in bending, it is in a right condition, but if it bends without snapping, it is too hard.

A great many cuttings will root in this condition, but they will not root as freely, and the roots will be fewer, harder, and more slender, and the plant will not be as vigorous as the one rooted in good condition. This rule of snapping does not apply to woody plants such as

Digitized by Google

Azaleas, Daphnes, Roses, etc—they require more firmness of wood to root easily. This question of healthy cuttings is of great importance, for an unhealthy cutting will not make a healthy plant.

I find that cuttings will strike readily in sand with a temperature of 60 degrees, while the atmosphere of the green-house should be 10 degrees lower. Some one asks, why use fine sand? Cuttings will root in other material, such as brick dust, rotted refuse hops, charcoal dust, and the like. We use sand because it is a clean and covenient material to work with.

I wish to speak also of this forcing, crowding process that many florists use. It is very injurious to the constitution of most plants. Prices are so low for most kinds of green-house plants that many of our eastern florists adopt this plan to make it pay. I know one firm that is sending plants over the west, who will insert cuttings, and in six weeks will send them out fine looking young plants. They have not grown up, but have been pushed up. The house they occupy is so hot that the workmen can stay in it but a few minutes at a time. Such plants are dear at any price, and a disappointment to the amateur. My experience with new varieties that I have to send east for is, that it takes from six months to one year to get them acclimated to the temperature of an ordinary green-house. There is another thing I would like to speak of, and that is, carelessness in propagating.

A careless man has no business near the propagating bench, for his carelessness will cause trouble and annoyance months afterward, for he does not know nor care whether his cuttings are true to name or not. I contend a good propagator consists more in a careful operator, than in a skillful one. We frequently find men who have spent the best part of their lives in the trade, but whose knowledge is rendered useless by carelessness.

The amateur is often puzzled over the terms used by gardeners in potting. Soil, they regard as the earth, a heavy soil as that in which clay predominates over sand. A sandy soil is that in which sand is abundant with the clay. Loam bothers some people. Generally it is used as the equivalent of soil. Writers often use the term sandy loam, when they might as well say sandy soil. A loamy soil should be understood as a rather heavy earth, lightened by culture. For potting plants, the soil should be rather dry—so dry that it will crumble readily between finger and thumb.

I wish to repeat a short story I read some time ago, for the benefit of the amateur. It is curious that lovers of flowers should so often

Digitized by Google

lack the potting instinct. A neighbor bought a pot of Dwarf Ageratum, complaining that it had stood all winter without growing. The gentleman examined the dish in which it was planted, and found it without drainage. He then turned out the soil and found two large lumps, each as large as a man's fist, of rank cow manure, half filling the pot. The water had settled into this vile stuff, where the roots absolutely refused to travel. The poor plant had squatted on top of the dirt and waited for better times. The good lady, who owned it, had succeeded easily with rank growing Geraniums, and supposed all plants would endure the same outrages. A friend wished him to prescribe for his sick Begonias. He found them in a rich barn-yard compost. Of course, the leaves were blistered and the plants dying. He shook them out, washed the roots, and planted them in good wood dirt, mixed with a little sand, and they soon showed vitality.

Another mistake in potting plants is the use of immense crocks which hold a gallon or more. Four to six inch pots will suffice for nearly all plants that should find a place in window or small conservatory. A plant will do very little upward work until it has worked below. It wishes first of all to touch the pot with roots on all sides. The same gentleman had a rose in a twelve inch pot that grew sickly in spite of all attention. He found the roots nestled in the center of the soil, while the outer roots had perished in the vain attempt to fill the space allotted them. It was a "five year old smothered in its grandfather's overcoat." The poor plant now enjoys a five inch pot.

Before quitting this subject of soil, I would say the preparation of potting-soil for plants is very simple, if you will take the upper surface, or sods as it is called, off an old pasture and pile it in a heap, until rotted, mixing with it from one-third to one-fourth of rotted refuse hops, decayed cow manure, or leaf mold from the woods. This soil should be repeatedly turned until it becomes friable. I find it advantageous to sift it before using. This soil is suitable for nearly all kinds of plants, unless it be a few fine rooting plants, such as Heaths, Azaleas, Chinese Primroses, and a few others. They require more leaf mold mixed with the soil. Serious injury is often done to plants from a want of, or an excess of moisture. A plant should never be allowed to flag or wilt from want of moisture. Neither should it be watered until the soil is soggy, or as florists term it, sour. How often we hear the complaint from ladies: "I have no luck with roses" (or with carnations. as the case may be). "They always lose their leaves, and will

Digitized by Google

not do anything for me." Now the trouble is not in the plants, but in the different treatment they require. Mr. Luck has nothing to do with it, it is either ignorance or carelessness. If people would study the *nature* of plants more they would have less cause to blame luck. The temperature of most sitting-rooms, as they are generally kept, is too dry for them. They require more moisture on the foliage. The dry atmosphere is favorable for red spiders, and red spiders destroy the leaves. Such plants must be syringed frequently with cold water on the under side of the leaves. Different varieties of plants require different treatment. There is another mistake my lady friends frequently make when they take in their plants in the fall after being bedded out, and severely cutting back. They water them too much. My plan is, after cutting back and repotting, to water sufficient to settle the soil around the roots, put them in the shade, and give them no more water until the buds begin to break, unless there is danger of drying out entirely.

Again, there is nothing neater, more attractive, or graceful, than a fine hanging-basket. But how often we see them a failure for want of proper care. Our hot sun and drying winds of summer are very severe on them. My plan is, after putting the drainage in the bottom of the basket, to line the inside of it with moss. It prevents the drying winds from penetrating to the roots of the plant. If you set your basket and plant in a pan of water once a week in summer, and in very drying weather twice a week, it will be good for it, and let it remain until thoroughly saturated, for moisture in a hanging-basket evaporates very rapidly.

Nearly all plants in baskets require frequent watering, except succulent plants. If the surface of the basket between the plants is covered with moss it will prevent the earth from drying out as soon, and will give a neater appearance to the basket. But remember that eternal vigilance is the price of plants.

Digitized by Google

BEDDING PLANTS.

BY SAMUEL BOWERS, CEDAR RAPIDS.

Mr. President—I cannot better commence my paper than by a few extracts from Breck:

"Flowers are the expression of God's love to man. One of the highest uses, therefore, which can be made of these beautiful tokens is to draw our thoughts and affections to Him who has so bountifully spread over our earth such a profusion of these emblems of purity as tokens of His love. The more we examine flowers the more we must adore the matchless skill of the Great Supreme. The Savior of men often retired to the gardens about Jerusalem to spend a quiet hour with His disciples, and to contemplate, without doubt, the beautiful in nature. We all know how He spake of the lily: 'Consider the lilies of the field, how they grow; they toil not, neither do they spin: and yet I say unto you, that Solomon in all his glory was not arrayed like one of these.' That Solomon in his wisdom was a lover of flowers is evident from the numerous passages in his Song. In our day we find a class of men who pare down everything to the grade of mere utility, and think it the height of wisdom to ask us who are enthusiasts in floriculture, 'Of what use are the flowers?'

"I have little sympathy with the man who can discover no beauty in the opening bud or blushing flower. Even the solidly practical Webster could use the truthful and eloquent words: The botany we cultivate, the productions of the business of horticulture, the plants of the garden are cultivated by hands as delicate as their own tendrils, viewed by countenances as spotless and pure as their own petals, and watched by eyes as brilliant and full of lustre as their own beautiful exhibitions of splendor. Horticulture is one pursuit of natural science in which all sexes and degrees of education and refinement unite. It attracts all, delights all. It seems to be a common field where every degree of taste and refinement may unite and find opportunities for their gratification."

With this prelude let us talk of the practical, the real creation of the garden scenes.

Digitized by Google

Massing plants in beds for ornament is of modern origin. Many of us remember the old way of planting one row or border from the front door to the place of exit, or one row on each side of the walk.

Now, all admit that our present plan of planting flowers in various shaped beds, and arranging them with taste, is a great improvement on the old straight row principle.

We often see mistakes made by raising or mounding up flower beds too high. The rain runs off of such beds without much benefit to the plants. Always keep the beds level with the surrounding soil. In such beds the winds affect the plants less and the moisture is better retained. In some situations a raised bed may improve appearances. In such cases the plants best suited for such beds will be given in proper connection. Four principal methods are practiced in the planting of flower beds: Massing plants of all colors together; planting a bed with a single color; planting the beds with a different color in each row; and patching the bed like a quilt with one color in each square.

Now, all these plans look well if some taste is exhibited in the selections, and the beds are well cared for. One of the finest beds we saw last season was designed and planted by a lady in our city. The center was Ricinus gigantum, then came one row of Canna robusta, next was one row of Caladium Esculentum, and the outer row was of Coleus pictus and Multiflora.

Another beautiful bed in the city had Green Leafed Canna for a center, and the outside was planted with Caladium. Both had a tropical aspect. The soil for these beds was made very rich, and they were watered with liquid manure once a week.

In the Centennial year we all remember the fine beds William Saunders had on the government grounds at Washington. They were planted with Canna robusta for center, and Single Petunia for the outside row. Some will say these plants are too common. This may be so, but we must insist that the common plants are always best when planted with a little extra taste and they receive extra care. To plant ribbon flower beds we are not as well supplied with material as they are at the east that thrive well in our climate. But I will name those we have had most success with. For a ribbon bed plant in the center Scarlet salvia, next plant Browallia or Ageratum for blue, then Feverfew for white, and on the outside Neimbergia grandiflora, or Scarlet Phlox drummondii.

The best plants for patch-work bed are the different varieties of Coleus, Alternanthera, and Centaurea. Plant each color in a square,

Digitized by Google

and keep the tops of the Coleus pinched back; if you do not they grow too rank to keep pace with the other plants.

Upon the whole it is hard to tell how to arrange flowers so they will please everybody. Taste, fancy, and opinion differ. Again, we change our mind every year about the utility and real beauty of some plant or flower. But we have some good old stand-bys that we plant one bed each of every year. We will name them in the order of our esteem: Verbena, Pansy, Feverfew, Phlox drummondii, Neimbergia grandiflora, Tulips, Monthly Roses, Erysimum, Catchfly, Browallia, Ageratum, Peony, Mignonette, Cacalia, Centranthus, Single Petunia, Dianthus heddewigii, Nasturtium minus, Asters, Ten Weeks' Stock, Gladiolus. These all flower freely with us, and they furnish a large amount of cut flowers all the summer long. We especially wish to say a good word for the rather neglected Double Feverfew. It is the best white bedding plant we grow.

Plants suitable for a raised bed or mound may include the Variegated Perewinkle, generally called Vinca major. This plant thrives in our climate, and makes a beautiful carpet of variegated leaves and vines. It will live with but little water, and the more sun it gets the prettier is its foliage. Almost any of the sedums will grow in such positions. We have an old plant of the sedum known as "Love in a Tangle." It is a prostrate plant with yellow flowers. We have seen some handsome mounds planted with this plant. It will grow in sun or shade, and is perfectly hardy with us.

OUR NATIVE FLOWERS.

BY PROF. J. C. ARTHUR, MADISON, WISCONSIN.

The value of the indigeneous plants of Iowa for ornamental purposes is not well appreciated by our own people. Among trees the elm, the most graceful and stately member of the forest, has met with a tardy recognition; while the American linden, quite the peer of its much pampered European cousin, is rarely planted in yards or streets.

Digitized by Google

Of shrubs, not a half dozen are common in cultivation. The climbers are rather better known. The Virginian Creeper has so many fine qualities it would be marvelous if it could long remain unappreciated, while the Virgin's Bower, Bitter-sweet, Wild Cucumber, and others are deservedly popular with the few, although in the Eastern States they have become general favorites.

It is more especially the province of this article to call attention to the desirableness in ornamental gardening of using more of our native herbaceous perennials. There are several matters it is well to bear in mind in selecting the objects for our care. We must especially consider the conditions of culture to secure the best development, and the suitableness of the plants to produce the effects desired. Under the first head come transplanting, soil, protection from wind and sun.

Fine, vigorous plants should be selected at the season their merits can be most fully judged; *i. e.*, when of full size, or in full flower. Mark the spot with a small stake, or otherwise, and in the fall or early spring while the plants are dormant remove them to the garden. Sometimes, however, it is necessary to take the plant, if at all, at the time it is found. In such cases, even with the utmost care, it is usually necessary to allow it the whole of the following season in which to recover and establish itself. The proper soil and the right degree of exposure must to a large extent be a matter of experiment. A plant growing in its wild state in wet boggy places will often thrive in the comparatively dry soil of the garden, while a forest plant when put under cultivation will sometimes bear the exposure of open ground. Blue Flag so common in marshes grows vigorously in the border; and the behavior of Spiderwort is similar.

The inference seems to be warranted that actual trial is needed to ascertain the best methods and conditions of garden culture for plants taken from the fields; and to attempt to repeat in the garden the peculiar habits of the wild state would often be needlessly troublesome. That some species will fail to accommodate themselves to these changes cannot be doubted, and so it is well to be prepared for failures. The exotics which form the staple of the flower garden have all undergone this process of testing their adaptability, and we may reasonably expect that the best of our own ornamental plants will some day have passed through a similar ordeal and their merits become known. There is, however, no occasion to apprehend serious difficulties, for while a few kinds will require and will repay special culture, the majority will need no unusual attention after becoming well established.

Digitized by Google

Let us now consider some of the æsthetic effects sought in flower culture. The different styles of planting may be roughly classified as individual, grouping, bedding, and mixed borders. The first is almost confined to larger forms, and is exemplified in the use of such plants as the Castor-oil bean. It is, however, more common to place a small number of individuals together, as a few herbaceous plants have sufficient density of foliage to give good effect when standing alone. The Compass-plant, in spite of its coarseness, is an excellent example for this method of planting. Give it a background of evergreens, with a lawn vase of simple Grecian pattern near, and the stately stems springing from the thick cluster of dissected root-leaves assert their dignity and their claim to æsthetic value.

In grouping, dependence is mainly placed upon the foliage for effectiveness. Several wild species will be found very suitable for this style of planting, and especially for filling out the edges of the groups. Two or three species of Wormwoods are worthy of mention in this connection, more particularly the white-foliage one, which has the whole surface of the plant covered with a soft, close wool.

Many excellent kinds may also be secured for bedding purposes, both for solid massing and for ribbon-planting, but the mixed border will receive the largest accessions from this source. One who looks attentively for such material will be surprised at the extent of his resources. The catalogues of English florists have many glowing descriptions of the plants growing all about us, but which we have never seen, at least have never observed, and certainly never have thought of transferring to the garden. A gentleman of the Middle States was showing his ornamental grounds, in which he took much pride, to a friend from a distance. When the round had been nearly completed he led the way into a more secluded part, and with the air of one who has reserved his choicest treasure to the last, directed his friend's attention to a clump of Azaleas in the loveliness of full bloom. He explained how they had been obtained of an English firm, and the care they had received. Beautiful they most surely were, and well worth all the trouble and expense bestowed upon them, but his friend did not have the heart to say that plants of the same sort could be found in almost every swamp in that section of country, and probably within a mile of his own house.

In selecting wild plants it is well to keep in view the fact that many may have their charms greatly heightened by cultivation, as well as by a judicious style of planting. Occasionally individuals with some

Digitized by Google

desirable peculiarities will be found, which beside their beauty will have the same advantage of rarity as exotics. Plants of the very early Dwarf Buttercup of the prairies of Northern Iowa, have been met with having perfectly double flowers, and which transplanted to the garden formed dense tufts, and proved fine bloomers. Some novel habit, or color of flowers may add greatly to the value of a plant, and sometimes almost transform its appearance.

It does not seem necessary to enumerate the species that may be used in the garden, for if they are to be taken from the fields, each may select such as meets the approval of his fancy. The increasing interest taken in native flowering plants has led a number of Eastern florists to give some attention to them, so that those who prefer can obtain well grown, strong plants of quite a number of species at a small expense and thus save the delay and trouble of starting with crude material.

A "wild garden" set apart for the exclusive culture of indigenous plants would be of much interest. But in general the most satisfactory result will be obtained by planting the native species among the others, with the sole aim of securing the most desirable effects possible.

REPORT OF COMMITTEE ON HOUSE PLANTS.

BY MARY C. BOGUE, SIOUX CITY.

There has been so much written about the cultivation of flowers that it is a difficult matter to give any new ideas; but, perhaps, I may be able to offer a few suggestions that may be of use to beginners.

One mistake made by beginners is that they undertake too much. It is better to begin with a few geraniums, then gradually work into the choicer plants. Almost anyone can make the common varieties of geraniums live, they endure *such* an amount of neglect, living in almost any soil.

The Silver-leaved, Bronze, and Tricolor, are not so easily grown.

Digitized by Google

During the summer I sink the pots in the garden; in September I re-pot in a soil containing two parts rich loam, one part sand, one part leaf-mold.

Cuttings started in June and treated in this way make fine winter blooms.

I have not space to enumerate all the plants which are suitable to be grown in ordinary homes. I will specify a few that are always satisfactory:

The Chinese primrose is becoming a great favorite. It is easily grown from seed. Sow the seed in March or April, in soil composed of two parts rich loam, one part sand, one part leaf-mold; sift a little sand over the seed, then cover your pots or boxes (I prefer boxes, as they do not dry out as soon as pots do), with glass, and set in a warm place. When the plants get the second leaf, transplant. The stems of the white ones will be green, so they are easily distinguished. Care must be taken not to allow the young plants to get too wet, or they will rot; in fact, the primrose does not require to be kept very wet.

The Double Petunia deserves special mention. It is a free bloomer, and the white ones are lovely. It is easily grown from seed or cuttings; it does not always come true from seed, therefore the better way is to start from a cutting. Cuttings rooted some time in June or July make fine plants for the coming winter.

The Cyclamen should be found in every collection. It can be raised from seed, although it is better to get the bulbs from a florist. It is a very free bloomer, and the flowers are very pretty. During the summer withhold water; in September begin watering them, and they will bloom finely through the winter.

The Oleander can be made to blossom beautifully during the winter by being transplanted late in the fall in very rich soil; use at least one-third well-rotted horse-manure, a little sand, and the rest good, rich garden soil. I first put in a thick layer of charcoal in the bottom of the tub; give plenty of water. I have treated mine in this way for the last few years, and have had excellent success. The blossoms are very much prettier than they are in the garden; those nearest the glass are a deep rose-pink, while those away from the sunshine are nearly white.

The Pelargonium deserves especial mention. Peter Henderson says, in Practical Floriculture: "If I was confined to grow but a single genus of plants for conservatory decoration, the Pelargonium would be chosen." It is impossible for me to describe this lovely plant, so I will not make the attempt. It is divided into two classes: the "show" and

Digitized by Google

"fancy." The show has large flowers, and the plant grows to a large size. The fancy have smaller blossoms, and the plant is rather dwarf in habit. Either variety is lovely. Pelargoniums are as easily grown as the common geranium. Strong cuttings, rooted in July or August, make fine flowering plants the following February. Old plants should be closely pruned in August.

All plants require a different treatment during the summer from that of winter; nearly all need neglecting. Of course, seedlings require good care during the summer months, in order to have healthy flowering plants for the coming winter.

DISCUSSION ON FLOWERS.

Following the reading, in whole or in part of these valuable papers, Dr. Kulp, of Davenport, was called upon for a few statements relative to the arranging and massing of bedding plants and annuals.

In response, he moved that Mr. Carpenter, of Galesburg, Illinois, be called upon first to give a few outline hints on laying out grounds.

Dr. Carpenter said that it was easier to do the work on paper or on the ground than to tell about it. The business I follow is supposed by many to be a sort of mystic art, and for the most part a sort of stylish humbug. If bandbox-gents, who swing gold-headed canes, practice it in the way of trying to reproduce a pretty picture which they have somewhere met with, the landscape art is sadly belittled, and may well be voted a humbug. But when reason and common sense are wedded in the prosecution of home-making, the art becomes ennobled and useful.

There can be no copying, any more than nature has a pattern for the trees and the plants. Each place has its special outlines of surface, to which every walk, road, tree, and shrub, must fit as a part of the entire picture when complete. Common sense comes in again in the selection of plants and shrubs that will suit all soils, exposures, and phases of summer and winter climate. Common sense must again be evinced in the adjustment of roads and walks to the every-day convenience of the occupants. In laying out the farm, the same careful adjustment of walks, roads, buildings, etc., to intended uses is all-important. The useful and the beautiful ever go together.

Dr. Kulp: In fitting up my grounds I got into trouble, and soon failed to suit myself. The skilled eye of Mr. Carpenter soon brought proportion and harmony of expression, and as my trees and plants

Digitized by Google

advance in growth, this expression of exact harmony is heightened. In the laying out, and relative positions of the flower beds, we have need of a settled plan, but the plan must be so in harmony with the grounds that no one will suspect its existence.

I love the green sward for the paths and borders of the flower beds. The tramping on the sod in the paths might be supposed to ruin their softness and beauty. The moist, rich earth in the adjoining beds keeps the narrow path in luxuriant condition.

In cutting the turf to form the beds, care must be taken to cut *very true*. The bed at first may be cut too small, and then carefully enlarged. Excavate the soil two feet in depth; make the bottom of the filling porous by the addition of gravel and sand, and enrich the surface to almost any extent. Mr. Bowers said, in his paper, that he preferred the flat surface for his flowers. I like the beds to be raised in the center from eight to twenty inches, depending on the size and width of the bed. The dirt at the edges should drop a little below the green turf. It is not best to make beds of large size. After the plants are set out, I cover the whole surface with well-rotted manure. Of course this includes the idea that the bedding plants and annuals are *transplanted*, and in no case grown from seed in the beds. In my boyish days, the square flower bed was decked with a rare mixture of colors and species. I now admire the beds of a single variety or species. The aster may be in one, the verbena in another, the dahlia in still another. And the beds may even be best with a single color. The Firebrand verbena makes a beautiful bed. So with other positive colors. If more than one color be planted, do not intermingle. A beautiful verbena bed on our grounds had red for a center, white next, and blue outside. Of course it was necessary to cut back now and then to the division lines; indeed, we cut our plants and flowers freely on all sides. It is a mistake to suppose that cutting the flowers lessens the supply.

I like to plant one color of geraniums in a bed. Bishop Wood in one bed, and Gen. Grant in another form a fine contrast. A bed designed by my wife pleased me during the season. It was in diamond form, with center planted with Double White feverfew in the form of a cross; then came alternanthera of mixed colors, with Scarlet geranium outside. The coleus, planted in carpet patterns, is very beautiful. Some of the new varieties are beautiful, but the good old ones hold their colors best. To look well through the season the coleus must be

Digitized by Google

severely clipped. We find it bears this treatment well, and grows in beauty through the season.

The petunia is old, but in proper place it is very showy. It should be planted singly and alone, in out-of-the-way places, to be seen from distant points. I had a large bed so placed, and it was a prominent object until severe frosts came, from a point twelve hundred feet distant.

A tropical bed should not be forgotten. The Castor bean in the center, then Canna, and Salvia Splendens, give a fine expression. A bed, with caladium in center, with coleus, achyranthus, alternanthera, and cuphea, in succession, is also beautiful.

The rose should be always recognized as queen. I place it first, something in the way that friend Foster puts the Turner raspberry among the fruits. I learned a little lesson this fall in *resting* the roses. I took them from the beds and potted them as usual, but the green-house not being ready, I put them away in the cellar for four or five weeks, and watered very sparingly. The leaves came off. They were then brought out to light and warmth. The buds began to expand, and they soon assumed an appearance of health quite unusual with my usual treatment.

Question: What flowers would you plant in the shade?

Dr. Kulp: In the shade I do not expect to grow flowers; but the yucca, the lilly, and the vincas, give variety to the expression, and the latter often bloom. The pansies luxuriate in partial shade.

The report of the Committee on Evergreens and Hardy Shrubs was now read.

REPORT ON EVERGREENS AND HARDY SHRUBS.

BY SILAS WILSON, ATLANTIC, IOWA.

Mr. President and fellow members—It "is not all of live to live." Man's happiness consists not in the abundance of possessions, but in a pure love, and just appreciation of the beautiful and true, which is

Digitized by Google

more to be desired than wealth or honor. Man's appreciation of the beauties of nature, that surround him, have much to do with his happiness in this beautiful land of ours. When spring comes in all its beauty, and the trees put on their mantle of green, and we hear the song of the birds, does it not lighten the burdens of our care?

The evergreen is indeed beautiful. How I like to see and talk of evergreens. However, my experience with the evergreen is limited. It is not expected that I enter at length into the particular methods of evergreen propagation, which has been so fully discussed in the books on forestry; nor shall I discuss the beauties and merits of the numerous varieties that adorn the loved homes, each and all of which I love, and would that I had the eloquence by which I might impress upon the mind of every person present the importance of planting evergreens.

At the head of the list of the most valuable timber trees, is the White pine of America, the Weymouth pine of Europe, which may justly be termed prince of all the trees of the forest, not only for its beauty, but also for its usefulness. Yet I cannot pass unnoticed the claims of other varieties. Mr. Bryant tells us that the Norway spruce is the loftiest tree of the European forests, growing from the hight of one hundred to one hundred and twenty feet. It is straight and upright with a diameter of from two to five feet. The wood is strong and light, and is employed for the same purposes as the White pine of North America. As an ornamental tree it is among the grandest. There can be no doubt that the Norway spruce is pre-eminently fitted for plantations designed for shelters. In the discussions of the horticultural societies of our sister State, Illinois, the advantages of evergreen belts for the protection of orchards, houses and farm buildings, have been for years persistently pressed upon the cultivators of the soil; the Norway spruce has been designated as the most suitable for this purpose. No other tree is more cheaply obtained from the nurseries, nor either is more successfully transplanted. It is perfectly hardy, its growth is vigorous and rapid, its branches and foliage dense and compact, and it readily adapts itself to a large variety of climate and soil.

The Hemlock is emphatically a northern tree. It is found from the Atlantic to the Pacific, and in many sections forming extensive and dense forests. In northern New York, and among the Alleghanies, the trees in the primitive forests are usually very large and straight,

Digitized by Google

attaining a hight of seventy or eighty, and often one hundred feet; its timber is coarse and strong.

The next in order after the Norway spruce is the Scotch pine. It forms a large portion of the forests of Northern Europe.

My time will not allow me to speak at length of the beauty of the American Balsam. Thomas Hardenburgh, of our county has some very fine balsam trees, fourteen years planted, attaining the hight of thirty-four feet, and forty inches in circumference, one foot above the ground. They succeed best planted in a group of four or five. The White pine stands before us pre-eminent in value as a timber, not second to any. I cannot forget the protection it gave us during the siege of Richmond and Petersburgh, Virginia, in the late war. They protected us during the day and found us an easy bed at night. How many thousands of our brave and true found sweet resting places on those beautiful cooling branches of the White pine. Yet, such has been its great value and equally the great demand, that nearly every vestige of the original forests has been swept from the Eastern States, and armies of lumbermen are to-day employed all along the line of our northern pineries.

Evergreens in Cass county succeed very well; especially Scotch pine, Austrian pine, Norway spruce, and Balsam fir are very hardy, and are almost as easy transplanted as any deciduous trees. The best time to transplant evergreens, in our soil and climate, is as soon as the frost is out of the ground in the spring. Large evergreens can be transplanted successfully in the winter, when the ground is frozen.

HARDY SHRUBS.

It is not necessary for me to enter into lengthy remarks on the beautiful shrubs, as there have been a great many reports and discussions on them. Any hardy shrub seems to be at home in Cass county; my choice of three would be the Snowball, Wigelia Rosea, and the Hydrangea paniculata grandiflora. The last named shrub is a magnificent plant; newly introduced from Japan, and is surely a great acquisition.

Digitized by Google

DIRECTOR'S REPORT FROM FIRST DISTRICT.

BY JONATHAN THATCHER, KEOSAUAQUA.

Mr. President and members of this Society—It is with regret that I am compelled to present to this Society an unfavorable report from one of the best fruit districts in the State. Especially so far as the king of fruits (the apple), is concerned. To start with, the snow fell to the depth of one foot on the 13th of December, 1878, with the ground barely frozen on top, after which time the mercury ran very low for the rest of the month, and for the most part of January following, ranging from a few degrees *above* to 24 degrees below zero. The effects of so low a temperature, when the ground was almost entirely unfrozen, was terrific, as well among vines as trees, the raspberry and blackberry vines worse than the grape, especially the Concord. Entire orchards were killed in some places on bottom lands along the Des Moines river, and very many trees in every orchard so situated. One farm on the bottom lands of the Des Moines river, in Van Buren county, had two orchards on it; one was about thirty-eight years old, the other ten, both being entirely swept away. In many other orchards so situated (both in Henry and Lee counties), many trees died suddenly after coming into full foliage, and many others died later in the season with apples on them before maturing the fruit. The orchards on the uplands fared a great deal better, so far as the trees being entirely killed, but every orchard had more or less blighted limbs through it, the Rawle's Janet seeming to suffer the most, next Smith's Cider, Willow and Dominie.

Next, with our late spring frosts, the apple crop was cut down to about one-third of the *usual* crop throughout the entire district, and of much poorer quality than usual, being much damaged by Codling moth and other noxious insects, the fruit dropping badly, and rotting badly on the trees. The fruit ripened early, and the temperature during the month of October being more than ordinarily high, necessitated gathering the crop before the conditions were such as to warrant its keeping, either out of doors, or in cellars, or fruit houses—*result*, a loss of fully one-half of the crop before the first of December. And even

Digitized by Google

after that time they continued to rot badly until Christmas, since which time, the few which escaped, seem to do better. The Rome Beauty has done better with me than any other variety, and Ben Davis next. The White Winter Pearmain so far as my observation extends, was free from scab, and produced about a full crop, yet suffered about the same as the majority as to keeping. Rambo bore exceedingly heavy crops generally, but did not keep until the middle of November. Grimes' Golden produced a very fair crop, and was more free from insect damage than the majority of apples. Ben Davis seems to still sustain its reputation as the market apple in all our markets, and as a cider apple, is beyond question the best, making a good body and a highly colored cider.

The price of apples ranged, at picking time, from sixty cents to one dollar per bushel, in different parts of the district, and at present they are selling at one dollar and fifty cents per bushel in Burlington, Keokuk and Ottumwa, many being shipped to those points from other States.

The pear crop was very light, not being sufficient to establish a market price. Cherry crop nearly a failure. A few peaches were exhibited at the fairs, and that is the whole history of the peach crop.

Blackberries were badly winter-killed; the Snyder (so far as my observation extends) coming out the best; prices ranging at eight cents per quart at Keokuk, Burlington, and Ottumwa, to fifteen cents in interior.

Raspberry canes were killed down to the snow line, which cut the crop short. Prices in the interior fifteen cents per quart, and eight to ten cents in the principal markets. Black varieties mostly cultivated are Mammoth Cluster and Doolittle, the former doing the best; some Davidson Thornless for *early*. *Red varieties*, Turner and Purple Cane; Golden Thornless does not give satisfaction.

Strawberry, fair crop, especially Green Prolific, it being a late variety. The Wilson was generally killed by late spring frosts, yet notwithstanding the Green Prolific is a pistilate variety, and that the Wilsons among mine (for the purpose of fertilization) were killed, bore a full crop. Strawberries sold generally for fifteen cents per quart.

The grape crop was a very fair one and brought remunerative prices, owing to the scarcety of other fruits. I heard of none selling for less than four cents per pound. They ripened very evenly and early, there being scarcely any to be had after the first of October. I am speaking of the Concord, it being the main variety. I have written to persons

Digitized by Google

in other parts of the district for information in reference to the fruit crop, and especially in reference to experience with new varieties of the strawberry, etc., but received no response, therefore will have to be content with my own observation. Having traveled over most of the district, have heard favorable mention of Crescent Seedling strawberry; have not tried it yet. I find some very promising seedling apples in Van Buren county, but the most part of them are fall varieties; I find one on the old Duffield farm, in Van Buren county, nearly as large as Gloria Mundi, but much more handsome, and of fine quality, being about the shape of Rome Beauty, of a rich, light yellow color, very prolific, and an extraordinary apple for drying; tree near forty years old, and bore fifteen bushels this poor year for fruit. I tried to save some of them for this exhibition, but failed.

I believe this society has put an embargo on discussions on the blight question. Therefore I shall not give my views on this question in this paper, but give my observation, which is about the same as that given by Mr. Budd in the *College Quarterly*, that it is much more apt to occur on rich, loamy soils, or highly manured orchards, than on clay or close and compact soils, being much worse on our bottom lands than on the bluffs.

NOXIOUS INSECTS.

The Codling moth was worse with us this year than usual, also the Borer. The season of depositing the eggs on the trees was the most extended this year that ever I knew; and the young larvæ the most *numerous*. Eggs were deposited very early in June and as late as the latter part of August—having taken the beetle out of the trees myself, full fledged, in the month of August. Therefore the application of soap the past year was of little value unless often repeated.

Trees have matured their wood exceedingly well this fall, shedding their leaves soon after the first heavy frosts. Nursery stock went into winter quarters in excellent condition, notwithstanding the wet weather which followed a severe drought in the early part of the fall. I had feared that the conditions were very favorable for bark-bursting nursery trees, the weather turning cold while it was very muddy, and the mercury running very low suddenly—but there is one other fact in connection with this subject which may be worth mentioning: On the 4th of July I sowed my whole nursery to buckwheat, which made a very rank growth, especially among the last spring's grafts. We then cut the buckwheat after two or three frosts, just clipping the

Digitized by Google

tops off of the grafts, leaving one row of grafts here and there through the nursery untouched, in order to get the benefit of the experiment, the result of which I propose to give to this society as soon as ascertained. On examination we find not one bark-bursted tree in our whole nursery; as to whether the buckwheat had anything to do with the latter I will not say. On examination I find the fruit buds in excellent condition at the present time (Jan. 16th), notwithstanding the mercury has been sixteen degrees below zero in the south part of the district; even the peach is all right yet. Houghton gooseberry bushes on my grounds leaved out new the latter part of October, and looked perfectly green until into December, and very many blossoms were to be seen on the May cherry, as well as new leaves, yet I see no injury to the fruit buds of the same.

We have had another chronic visitation from the itinerant tree peddlers, in Van Buren county, the past year, and they were very successful too. Their plan of operations being, to make a present of some flower or plant to the lady of the house where they were not likely to succeed, or the present of a Russian apple tree to the husband, just to introduce their trees or plants; the result was most invariably that they would take an order for one dozen or half dozen Russian trees at the rates of $5 per dozen or 50 cents per tree single. And some new flower, or strawberry which flourished better in blue grass sod, than anywhere else, and with stems so high and strong that they would hold the berries above the leaves in full sight, and at the same time save stooping so low to pick them. But the worst feature of the whole transaction *is*, that it is impossible *now*, to ascertain the specific name of any berry, grape, apple, or other fruit, which they delivered to their patrons. When taking orders they presented catalogues with names of varieties, knowing well that no farmer could ever remember those *jawbreakers*, but so soon as the order was signed the patron was presented with a duplicate which only gave generalities. *Thus*, one-half dozen Russian apples, three extra grapes, one dozen fine strawberry, one pair mulberry, etc. Downing's everbearing mulberry was only sold in pairs (male or female), and only one pair to one person at $3 per pair. Now Mr. President I should like to have an emphatic expression from this Society as to whether the so *called* female mulberry tree will not bear fruit just as well without the so called *male* tree, in close proximity to it; also, whether a nurseryman can tell said *male* or *female* apart in the nursery before they bloom. I beg pardon for appropriating so much time to this last subject in this paper, but the

Digitized by Google

subject is of vital importance to the farmer, the orchardist, and the nurseryman. The plum crop was so near a failure that I forgot to mention it at all. My Lombard trees were all killed last winter; this latter was our favorite. Miner and Wild Goose escaped uninjured.

This district being the most heavily timbered portion of the State, forest tree planting receives very little attention, but Osage hedge planting is increasing largely. The clumsy and cumbersome rail fence and the tall scraggy untrimmed Osage are fast giving way to a most beautiful and ornamental trimmed hedge, over the tops of which you can look at the crops or lawns without obstruction, and notwithstanding the law of curves, these straight and right angled lines of artistically trimmed hedges are an ornament to the farm and beautiful to the eye of the traveler. In conclusion I will say that I am in favor of a law restraining stock, as *right* and *just*, but a large portion of the residents of my district are instinctively in favor of some kind of fences.

REPORT OF DELEGATES TO THE AMERICAN POMOLOGICAL SOCIETY.

By the action of this Society at its last annual meeting, two delegates and two alternates were appointed to attend the biennial meeting of the American Pomological Society in September of the then current year. H. W. Lathrop, of Iowa City, and E. H. Calkins, of Burlington, were chosen such delegates, and R. P. Speer and Jonathan Thatcher were chosen alternates. The meeting was originally appointed to be held at Nashville, Tennessee, but the place of meeting was afterward changed to Rochester, New York, where it was held on September 17 to 19, inclusive.

Your delegates, in the absence of any positive instructions, presuming the intention of the Society to be that they should negative as far as possible the old stereotyped idea that "fruit could not be grown in Iowa," and in order the more effectually to do it should collect and exhibit the horticultural products of the State, entered into correspondence with each other and with the officers and members of the

Digitized by Google

Society respecting such exhibition, and at the proper time began the collection of fruit. We found this to be no small task, inasmuch as most of the planning had to be done by correspondence, which was necessarily quite extensive, and as in the sections of the State where the delegates reside the fruit crop was almost a failure. We found willing hands wherever we applied for aid, and we wish hereby to tender our thanks to the many friends of the cause who so promptly responded to our call. Conspicuous among them were C. G. Patten and E. R. Heisz, of Floyd county, who forwarded to us a most excellent collection of summer and autumn fruits, which did much toward gracing our tables and enhancing the value of our exhibit. Without their contributions our exhibit would have lacked materially in being complete, as many varieties contained therein could not have been obtained in a more southern section. Expecting that a large show of fruit would be made at the State Fair, as the fruit crop in the central counties of the State was a full one, and that a good selection could be made there, one of your delegates attended for the purpose of making such a selection. D. W. Adams, of Waukon, John Wragg, of Waukee, John C. Smith, and A. S. Kingman, of Des Moines, each had a large and good display of apples on exhibition, embracing most of the named sorts grown in the State, as well as a good assortment of unnamed seedlings. The seedlings were quite a prominent feature in Mr. Adams collection. At the close of the fair these gentlemen all placed their collections at the disposal of your delegates to make therefrom such selections as were needed to forward to Rochester for exhibition at the meeting of the American Pomological Society. From these the best specimens, six of each kind, were selected, and the selections so made embrace over two hundred varieties. In making the selections and in packing the fruit we were very materially assisted by Mr. Wragg, who devoted his whole time to the work till it was completed, and this Society is under many obligations to him for his labor in this behalf performed. Mr. Wragg had by far the largest and best collection of apples at the fair, as it embraced not only all the varieties grown in his own orchard, but those in the orchards in his own and adjoining counties. From the orchard of Cyrus Saunders, in Johnson county, a considerable collection was made that could not well be not elsewhere, and also a small one from the orchards of Henry Strohm and Levi Robinson. Our "old friend" Suel Foster, always to be relied on in such an emergency, sent us the fruits from his own orchard, contributing several valuable varieties rarely to be found in

Digitized by Google

other general collections. Hon. Jonathan Thatcher sent us a collection of great value which he had been at much pains to collect from Van Buren county, and which contained many of the most valuable specimens we had to show. Col. Brackett made a fine contribution from his neighborhood. W. W. Gearhart, near Burlington, furnished us with about twenty varieties from the family orchard, hardly surpassed by any contribution of its size. J. J. McMaken, Middletown, and Henry Avery, of Burlington, procured from their respective orchards such varieties as we desired. The distance to be transported being great, and the expense of carriage necessarily high, we were compelled to curtail our collection and decline from several of our friends contributions they would gladly have made. Among them were R. P. Speer, G. A. Knowles, Geo. W. Shaw, W. G. Clark, C. B. Osborn, and others not now called to mind.

While some of the early fruits were too far out of season to show in perfection, we exhibited in fair show condition, Sops of Wine, William's Favorite, Early Pennock, Oldenburg, and some others of the early maturing ones, but these came from the northern part of the State.

The limits within which our apples were gathered embraces nearly three degrees of latitude, as some of them came from Waukon, about sixteen miles from the Minnesota line, and others from Keosauqua, less than half that distance from Missouri. There was a marked difference in the winter varieties where duplicates were brought from the two extremes, those from the south apparently from ten days to two weeks in advance of those from the north, both in color and maturity.

Our fruits were forwarded in part by fast freight line and in part by express, and all reached Rochester in good time, and with few exceptions, of early and over ripe fruit, in good condition.

The exhibition was held on the grounds of the Rochester Driving Park Association, which were then occupied by the Western New York Agricultural Society, some three miles distant from the central part of the city, and under a tent pitched on the grounds for the use of the American Pomological Society. One of our number being on hand early, an eligible place was secured for the display of our fruits, and the work of unpacking vigorously pushed on. We found it to be no small undertaking to unpack, classify, and arrange, nearly five hundred plates of apples of which our collection consisted. Owing to the amount of labor thus to be performed, it was impossible for either

Digitized by Google

of us to be present at the opening of the session, which took place at 10 A. M., on September 17th, at the Court-house, in the central part of the city. Nor could we attend many of the subsequent sessions. But we went there, not so much for the purpose of taking part in the deliberations of the society, as for the purpose of showing in the very heart of appledom, not only to the members of the American Pomological Society, but to the fruit growers of Western New York, in attendance at the Fair, that our industries were not all confined to the raising and exporting of cattle, hogs, and sheep, or the growing of wheat, oats, and corn, the abundance of whose crops were burdening their lines of freight transportation, but that one of our great industries was the production of fruit, and that we had the soil and climate that, coupled with energy, perseverance and intelligent cultivation, was making, and will continue to make, ours a fruit growing State. And this showing we did make, for we had the *largest single collection* in the tent, and that there should be no doubt as to where it came from, we had the name "IOWA," in large letters painted on three large card-boards that were hung up in the rear of our table, that "all that run might read."

The venerable President, Hon. Marshall P. Wilder, yet suffering severely from the effects of a fall received upwards of a year previous, added to tbe infirmities of age, was unable to be present, and in his absence, Hon. P. Barry, first Vice-President, was called to the chair and presided during the session. In his absence, the able address of the President was read by Dr. John A. Warder.

The various committees being appointed at the morning session set about the work assigned them. A little before noon the committee to make awards of the Wilder Medals, made their appearance on the ground to examine the various exhibits of fruit. By dint of hard work we had our tables prepared, but not so well arranged as a little more time would have permitted us to make, yet they presented a tasteful appearance and attracted much attention not only from the members of the Pomological Society, but from visitors at the Fair. We showed near three hundred varieties of apples (probably more rather than less), and we had the satisfaction of receiving the first award made by the committee, they considering our fruit exhibit of sufficient merit to stand at the head of their list and occupy the first place in their report.

The various awards made were as follows:

Digitized by Google

We make the following awards of the Wilder medal, and have our action on the precedent established at former meetings of this society:

1. For the largest and best collection of apples exhibited by a society—to the Iowa Horticultural Society, a silver medal.

2. For the largest and best collection of apples exhibited by an individual—to E. Moody & Sons, of Lockport, New York, a silver medal.

3. For the largest and best collection of pears exhibited by a society—to the Missouri State Horticultural Society, a silver medal.

4. For the largest and best collection of pears exhibited by an individual—to Ellwanger & Barry, of Rochester, a silver medal.

5. For the largest and best collection of grapes exhibited by an individual—to T. S. Hubbard, Fredonia, New York, a silver medal.

6. To the Hon. Marshall P. Wilder, Boston, for a collection of pears, a silver medal.

7. To J. H. Ricketts, Newburgh, New York, for collection of pears and grapes, a silver medal.

8. H. E. Hooker, Rochester, for collection of grapes, a silver medal.

9. To the Missouri State Horticultural Society, for collection of grapes, a silver medal.

10. To Fruit Growers' Association, of Nova Scotia, for collection of fruits, a silver medal.

11. To Ellwanger & Barry, Rochester, for a collection of grapes, a bronze medal.

12. To the Michigan State Horticultural Society, for a collection of fruit, a bronze medal.

13. To W. B. Bateham, Painesville, Ohio, for peaches, a bronze medal.

The new grapes whose merits were canvassed in the discussion, are the Prentiss, Moore's Early, Niagara, Pocklington, and Lady Washington. The summing up of the discussion was about as follows:

Prentiss—Bunch good size; berry small, skin firm, never cracks, a good keeper, ripens with Concord, foliage thick and healthy, vine hardy.

Moore's Early—Bunch large, berries very large and black, seedling of the Concord, as hardy and vigorous as the parent and two weeks earlier.

Niagara—Color white, leaf large and thick, and they hang long on the vine; leaves never mildew and the fruit hangs long on the vine.

Digitized by Google

Pocklington—A new white grape, berry large but lacking in quality; clusters large, vine hardy as Concord.

Lady Washington—The merits of this new favorite of Mr. Ricketts were not discussed in the meeting, but when the committee on fruits made their report it received at their hands the award of a silver medal, but so strong was the opposition to giving it so much of an endorsement before its true merits had become generally known and tested that the report was recommitted with instructions to the committee to strike out from their report that portion awarding it a silver medal, which they did, but awarded Mr. Ricketts the medal for his "collection of pears and grapes."

The discussion on the new grapes was an interesting, intelligent and profitable one, as the Concord was the standard or unit of measure by which all the qualities of the new candidates for public favor were measured or compared. How well these new varieties will be adapted to the various soils, climates, and exposures of our widely extended country, can only be known after actual trial, but among them undoubtedly will be found some that will prove to be valuable acquisitions to our fruit lists. With the exception of grapes and peaches no new fruits were shown conspicuously, and the discussion of new fruits was confined to grapes alone.

The new peaches are Princess of Wales and Mrs. Brett, and they were originated by Mr. Ricketts, of Newburgh, N. Y.

A grand reception was tendered the members of the Society on the evening of the second day's session, which was unanimously accepted, and as we cannot give a better account of it than appeared in one of the daily papers of the city *(Democrat and Chronicle)* we here transcribe it as contained in that journal:

GRAND RECEPTION IN THE EVENING.

Few distinguished and worthy societies or individuals can come to Rochester without being at once tendered the generous hospitality of our city's most liberal and public-spirited citizen, D. W. Powers. The American Pomological Society is no exception to this rule. Last evening the Society accepted a cordial invitation to attend a grand reception at the Power's Art Gallery. Altogether, about two hundred persons responded to the call and accepted the hospitality proffered. Many of the gentlemen were accompanied by their wives. After the company had spent an hour or two in admiring the rare beauties of art in the galleries and in listening to the music of the grand orches-

Digitized by Google

trion, all were invited to go up higher and participate in the festivities of the banquet hall. As they reached the hall a scene of gorgeous beauty was before them. The supper tables were tastefully set all around the outer portions of the room, and down through the center was a long, broad table, heavily laden with specimens of every conceivable fruit, from orchard, vineyard and garden. On either end there were two tall, double-rimmed standards, literally covered with all the many colored fruits which could be woven together among the stems of all sorts of luscious grapes. In the center of the table a higher and larger silver standard was arrayed in all the magnificence of the most beautiful flowers that money can buy. The entire upper portion of the table besides was covered with baskets and servers of more varieties of fruits, interspersed with cake-baskets, ice cream servers, salad dishes, and other tempting viands. The scene, taking all in all, was one never to be forgotten, and right appropriately was the festive occasion termed the "Feast of the Goddess Pomona." Among the gentlemen in attendance from all parts of America, one who has been present on some of the grandest occasions in the annals of noted receptions, said that with the exception of the great table at the Philadelphia Exposition on the occasion of the National reception, he never before saw such superb taste, elegance in beauty, in a showing of fruits and flowers together, while the fruits of the present occasion, if taken separately, were finer and more varied than any which he had ever before seen in any part of the world. An elaborate bill of fare, made up entirely of fruits, had been prepared, and everybody read it entirely through, though none would have been capable of eating it through. At the bottom of the second page the following verse was appropriately printed:

"In all places and in all seasons,
Flowers expand their light and soul-like wings,
Teaching us by most persuasive reasons,
How akin they are to human things."

The first regular toast ("The American Pomological Society and its Presidents") was responded to by Patrick Barry, who alluded to the growth of pomology in America since thirty years ago, when, at the first meeting in the City of New York, he acted as one of the secretaries. He also spoke in terms of the highest respect of the esteemed, though absent President, Hon. Marshall P. Wilder, from whom a telegram of greeting had just been received and read. The second toast

Digitized by Google

was to "The Pomology of the East," and W. C. Strong, of Massachusetts, responded to it. The third was "The Pomology of the West," responded to by Dr. J. A. Warder, of Ohio. "The Pomology of the North" was the fourth toast, and Samuel D. Parsons of Flushing, L. I., made the response. The fifth, sixth and seventh toasts were: "The Pomology of the South," "The Pomology of the Dominion," and "D. W. Powers, our Generous Host." They were responded to respectively by Dr. Samuel Haight, of Atlanta, Ga.; Rev. Dr. Burnett, of Canada; and Hon. Charles S. Baker, of Rochester, each gentleman making a happy and appropriate speech.

When the question presents itself to us as to what is the province of the American Pomological Society, or what are the legitimate duties to be performed by it, or the practical benefits to be derived from a connection with it, we are at a loss for an answer. Thirty-one years ago, when it was organized, a great work lay before it, and that work, so far as it could do it, has been done. That part of the work now remaining undone is in the hands of State and local societies, where it more properly belongs, and where it can be much more intelligently and promptly performed, Since its organization our country has grown too large, and its horticultural interests too varied and complex, to be under the exclusive jurisdiction of one Society.

Those who have some new fruit and think there are "millions in it," may attempt to use its ponderous machinery for the purpose of adding keenness to the edge of their pomological axes, but there are members enough on the alert who will see that the old public grindstone is not too much perverted to private uses.

NOTES ON FRUITS EXHIBITED.

The Missouri Horticultural Society exhibited as claimed, 114 varieties of apples, 27 of pears, and nearly 30 of grapes. Much of their exhibit of pears and grapes were in unfavorable condition to do them full justice, the result of over-ripeness and bruising in transit.

The collection of apples was excellent, and reflected great credit upon the few men who had the spirit to undertake so great a task.

The Michigan Horticultural Society made a small exhibit compared with what they might do—consisting of about 25 varieties of apples from north part of the State; also, by Grand Rapids Society, a collection of like number, supplemented by a moderate collection of pears, peaches, plums and grapes.

Digitized by Google

Hon. J. S. Stickney exhibited a limited number of apples from Wisconsin of the hardy and showy varieties, among which were Alexander, Kentish Fillbasket, Fameuse, Plumb's Cider, and a few others that were rare specimens of beauty, and in size seldom equalled.

The Fruit-growers' Association of Nova Scotia sent a collection of fruit consisting of apples, pears, plums, and crabs, well worthy of an award. Several varieties of their apples were superior in character, particularly Red Astrachan, Oldenburg, Alexander, Yellow Bough, and some few others.

The individual exhibits were far more numerous than those by societies, and many of them were worthy of special mention.

Ellwanger & Barry, of Rochester, led off with the prize collection of pears, consisting of 108 varieties of rare beauty and great perfection, crowned with a large platter filled with magnificent specimens of the *Souvener de Congres*, a single one of which pulled down the beam at 22½ oz. weight. They also exhibited twenty-eight varieties of grapes and forty-seven of apples.

Hon. Marshall P. Wilder contributed 137 varieties of pears—a most remarkable collection, but lacking in the perfection of color of those grown on the shores of the lakes.

E. Moody & Sons, of Lockport, N. Y., show ninety-five varieties of pears and about eighty of apples, the pears falling but little below the collection of Ellwanger & Barry.

John Saul, District of Columbia, exhibits ninety-five varieties of pears. Many of these are past maturity, and show that they have come from a southern latitude.

The greatest attraction to professional fruit-growers was the exhibit of grapes, as here were numerous candidates for public favor, a few of which were not yet upon the market, being kept back by the originators, or their representatives, until more widely known before being offered to the public. The number of white grapes claiming parentage from the Concord was striking, several of which were of fine quality, and the claim was set up that they were in hardiness and productiveness but little if any inferior to the parent grape.

T. S. Hubbard, Fredonia, N. Y., exhibited ninety-two varieties, among which were many of excellent quality. His "pet" is the *Prentiss*—seedling from Isabella—in color lighter than Rebecca, which it somewhat resembles. On a branch on exhibition two feet in length were nineteen clusters of grapes.

Digitized by Google

J. H. Ricketts, Newburgh, N. Y., exhibited twenty-seven varieties of seedling grapes of high quality. Lady Washington the most prominent. The bunches of this are very large, well shouldered, and the fruit of high quality. Single bunches 1½ pounds in weight.

H. E. Hooker, Rochester, exhibited twenty-five varieties, the most conspicuous being the Brighton, a large sized, amber-colored grape with abundant bloom, and of very sprightly vinous flavor, attaining in the vicinity of its home a high degree of excellence.

Niagara Grape Co., Lockport, N. Y., exhibited Niagara, a white seedling of Concord; berries large as the parent; clusters large; berry firm and rich; season of Hartford, and keeping until November.

There were probably a limited number of small collections of grapes not mentioned in this report—the press of persons interested in obtaining information concerning this species of fruit being so great as to greatly embarrass one getting all the data necessary to making a report as complete and correct as we would like. If any worthy variety or collection has been left out such omission was unintentional on the part of your delegates.

ADDITIONAL RESOLUTIONS.

Mr. Patten introduced the following:

Resolved, That a committee consisting of C. L. Watrous, A. H. Lawrence, Suel Foster, Al Swalm, and G. B. Brackett be appointed by this society to ask of the honorable legislature a suitable room in the new capitol for the use, library, and museum of this society.

Adopted.

Dr. Kulp offered the following:

Resolved, That this society ask the honorable legislature to pass an act to create the office of State Entomologist.

Adopted.

The committees of award on fruits and flowers were now ready to report.

Digitized by Google

REPORT OF COMMITTEE ON COUNTY COLLECTIONS.

Your committee on county collections of fruit having examined the several exhibits offered for premiums, beg leave to report the following awards:

"Best collection of apples grown in any one county," we award to John Wragg, of Dallas county; $20.

"Second best collection grown in any one county," we award to George Avey, Mahaska county; $10.

"Best collection grown in any one county in Northern Iowa north of the north line of Clinton county," we award to C. G. Patten, of Floyd county; $20.

"Second best collection grown north of Clinton county in any one county," we award to A. J. Haviland, of Webster county; $10.

We find the collection of Mr. Avery to be superior in point of number of varieties, which collection, made at so late date as the present, reflects great credit on the part of the growers, also on the gentleman who massed the collection. Yet we esteem the exhibit made by Mr. Wragg, though inferior in number of varieties, to be superior in point of excellence, particularly in being exhibited in better condition and the flavor less impaired by absorption of vegetable odors of the cellar.

Respecfully submitted.

[Signed] E. H. CALKINS,
H. C. RAYMOND,
G. O. HILTON,
Committee.

REPORT OF COMMITTEE ON INDIVIDUAL COLLECTIONS OF APPLES.

Your Committee on Individual Collections of Apples beg leave to report as follows:

For the best collection of apples we award the first premium to H. R. Teller, of Albia, Monroe county; $10.

For second best collection we award the premium to A. E. Garrison, of Des Moines; $5.

Digitized by Google

In both of these collections we find the following worthy varieties, in fine condition, of good size, and well colored, viz.: Ben Davis, Rome Beauty, Northern Spy, Rawle's Janet, Winesap, Jonathan, Willow, Belmont, Wagner, Yellow Bellflower, Lawver, Roman Stem, Ortley, Ladies' Sweet, Peck's Pleasant.

Besides the collections to which premiums were awarded the committee find excellent exhibits, which are deserving of special mention, made by C. G. Patten, from the extreme northern portion of the State, and by Jonathan Thatcher, of Van Buren county, and E. M. Guffin, of Johnson county.

[Signed] G. B. BRACKETT,
GEO. W. SHAW,
H. STROHM,
Committee.

REPORT OF COMMITTEE OF AWARDS ON SEEDLING APPLES.

Your Committee on Seedling Apple Exhibits beg leave to report, as follows:

For best collection of apple seedlings we award first premium to H. R. Teller, of Albia, Monroe county; $10.

The premium offered for the most promising seedling apple we award to John Wragg, of Dallas county; $5.

Respectfully submitted,
SUEL FOSTER,
A. J. HAVILAND,
R. P. SPEER,
Committee.

ADDITIONAL SEEDLING REPORT.

We, the undersigned, members of the Seedling Committee, hereby commend to the favorable notice of the members of this Society a very promising seedling variety of the apple, keeping well into winter, exhibited by Suel Foster, of Muscatine, and named "Barnard."

R. P. SPEER,
A. J. HAVILAND.

Digitized by Google

Appended is given the

HISTORY OF PREMIUM SEEDLING OF J. WRAGG.

The seed from which the tree was grown was planted by a Mr. Keeney, about twenty-nine years ago. This tree, with four others, was taken from the seed-bed by Mr. A. Shoemaker, and by him planted on his residence lot, in what is now the village of Carlisle, Warren county. This alone proved of value, and has been a constant bearer for many years. The tree is still healthy, and bids fair to last many years. It stands between the house and street, and has had no cultivation for a long time, if ever; tree upright, spreading, and a vigorous grower; young shoots very stout; color of wood quite dark; fruit, medium to large, quite flat, but somewhat irregular; color, from light to very dark red; glossy, with small grey specks in the skin; stem stout; cavity open; calyx usually small; basin deep, somewhat irregular; flesh, yellowish white, rich, crisp, sub-acid; quality, best; season, from December to May.

Yours, very truly,

J. WRAGG.

REPORT OF COMMITTEE ON FLORAL EXHIBITS.

Your Committee on Floral Exhibits beg leave to report the following awards:

For the best collection of green-house plants we award the first premium to Peter Lambert, of Des Moines; $15.

The premium on best collection of house plants we award to Peter Lambert; $10.

The premium for best collection of plants in bloom we award to Peter Lambert; $8.

Respectfully submitted,

GEO. H. WRIGHT,
GEO. F. HURD,
Committee.

Digitized by Google

REPORT OF COMMITTEE ON CANNED GOODS.

Your Committee on Canned Goods beg leave to report: That we find on the tables a very commendable display of canned goods by A. Kemble, of Oskaloosa, consisting of the following: Strawberries, grapes, cherries, apples, tomatoes, sweet corn, sweet potatoes, and Hubbard squash. Mr. Kemble puts up all these goods for sale, and we find on testing these samples that they compare favorably with the very best we have ever found in the market.

Respectfully submitted,

GEO. H. WRIGHT,
H. C. RAYMOND,
A. J. GRAVES,
Committee.

On motion society adjourned to half-past seven.

THURSDAY EVENING SESSION.

Session opened at hour set, and the report of Committee on Soil Variations was announced in order.

OUR DRIFT SOILS—THEIR VARIATIONS.

BY H. W. LATHROP, IOWA CITY.

Nearly, if not quite, the soils of our whole State are a drift deposit which had its formation in the glacial period during its last epoch. The general classes into which they are divided, and by which they are distinguished, are the drift, the alluvial, and the bluff deposits. The drift is the oldest or first formation, and the alluvial is the last or most

Digitized by Google

recent of the three. The bluff deposit occupies an area along the western boundary of the State, varying in width from twenty-five to one hundred miles, and as this formation was the subject of a paper read at our last meeting, from the pen of H. C. Raymond, of Council Bluffs, wherein the soils of that section were ably and freely treated, I shall pass that part of the subject without further comment.

The depth of the drift varies from a few feet to over two hundred feet in thickness, and is composed mostly of clay, sand, and gravel, with occasional boulders, the clay being by far the largest part of the composition. The gravel is found more abundant in the northern sections of the State, and as we recede from the northern boundary southward, the gravel becomes less frequent and the clay more predominant.

In a small portion of the northeastern section, and also in the northwestern, the azoic rocks crop out, the former being the Potsdam sandstone, and the latter Sioux quartzite; the rocks underlying the drift in most parts being limestone formations of a more recent age.

Our river valleys, as well as the whole surface of the country, give abundant evidences that our surface soils are a lacustrine deposit, and that the river valleys have been formed by the erosion of the waters when their recedence gave place to dry land. This erosion has in many places gone to the bottom of the drift and reached the limestone formations, making the valleys in some places reach a depth of from twenty-five to two hundred feet. This gives a good drainage to the whole surface of the country, and leaves us few, if any, swamps or extensive marshes in any part of the State.

The drift soils were formed in part by the accumulation of rocks in Minnesota, and in part by rocks which have their origin in Iowa, and these rocks must have been very soft and friable, for the constituents of our soils are very finely powdered. It is an old maxim that the "Mill of the Gods grinds slowly, but it grinds exceedingly fine," and in no case is this better illustrated than in the work which that mill did in erecting from its constituent rocks our Iowa soil.

That lime is one of the component parts of all our soils, is attested by the living characters of the waters of our springs and wells which percolate through them.

But it is the first few feet of surface soil, with its underlying subsoil, that most concerns the horticulturist. These first few feet appear to have been originallya fine silt deposited on the surface before the recedence of the waters, and it has been fertilized with the remains of

Digitized by Google

animal and vegetable life during the most recent epochs of the earth's history. The immediate underlying subsoil does not differ materially from the surface soil, only that it has not received and had incorporated with it the fertilizing materials that have been produced on the surface, nor has it been exposed to the changes produced by the alternations of the seasons. In most places this subsoil is of sufficient porosity to afford good drainage through it. Fortunately, in Iowa, we have but few localities where we have a hard-pan subsoil, and there are but few localities also where ponds are abundant or extensive, or where there are bogs or peaty marshes.

It may be asserted, without fear of contradiction, that ninety-five per cent of the whole area of the State is tillable land.

The best subsoil we have is a joint clay, that under the disturbance of the plow or spade crumbles into small cubical shapes, the fraction of an inch in size. It has a great capacity for holding moisture, and during our severe droughts it yields it to the surface under the influence of capillary attraction. Immediately below this is a tenacious yellow clay that becomes very hard when dry and exposed to the sun, but when subjected to the influence of an abundance of water, becomes very soft.

Wherever our roads are composed of this material, in a dry time they are very hard and smooth, but in a wet season, or when the frost is just leaving the ground, they are almost impassable.

Such is the nature of these soils that the roots of trees take a firm hold upon them, and the trunks of our largest trees will bend and break under the influence of our severe storms before they will upturn their roots from their fastenings.

On the bluffs skirting the rivers and creeks, the soil is more nearly a pure clay than eleswhere, and here are found our groves of white oak timber. This soil contains less of the remains of animal and vegetable life than any other except the pure sand, and after receiving a moderate fertilizing from the barnyard it is the best orchard and vineyard soil we have, more nearly perfecting the fruit in color and flavor than any other. Trees in this soil grow slowly and ripen their wood early. Some of the best orchards and vineyards in the vicinity of Iowa City are on this kind of land, the soil on it, containing the *humus*, being but a few inches in depth.

This clay, or loess formation, seems well adapted to the growth and support of some of our cultivated plants. I have seen along our railroads, where the surface soil had been removed to the depth of several

Digitized by Google

feet, leaving nothing but the pure clay, clover both red and white, growing luxuriantly, and this clay had received no fertilizing but the frosts and snows of a few winters and the suns and rains of a few summers.

As we recede from the river bluffs and approach the prairie, the absence of white oak, and the presence of red oak, burr oak, hickory, and other varieties of timber, indicate a soil of more depth and richness, containing more *humus* which gives a greater stimulus to tree growth; in fact here we often find our deepest, richest, and strongest soils for the growth of all kinds of vegetation. From land of this kind was taken the soil shown at the Centennial Exposition from Johnson county, and it retained its black color almost to a depth of six feet from the surface. Some land of this kind I know to have been in cultivation for thirty years, with little or no fertilizing, and it appears to be nearly as productive now as it was a quarter of a century ago. The soil of our prairies does not differ very materially from this. In the sloughs it is sometimes of a peaty nature but this is often changed by thorough drainage and cultivation. These clay soils hold with wonderful tenacity any animal, vegetable, or mineral fertilizers that are applied to them.

The rare exceptions in the drift formation are the sand-ridges as found both in timber, and on the prairie. They are undoubtedly the remains of disintegrated rocks, but where formed, or when or how deposited, is not easy to be conjectured, unless we credit some glacial iceberg with depositing them where they are found. They are not well adapted to the growing of fruit trees, and less so to the apple than to most others. The roots of trees do not take as firm a hold in these as in the clay soils, and they are easily affected by drought, as they readily part with the moisture they contain, and the fertilizing material applied to the surface easily leaches through beyond the reach of rootlets. When, however, a good quantity of fertilizing material is applied, and good cultivation given, a readier response is obtained than in any other soil, for they receive heat with avidity, and retain it with tenacity, and the gardener who has such a soil is always the first in market with his matured produce.

The limestone soils of Kentucky are not more prolific in the production of the far-famed "blue-grass" raised in that State, than are the silicious soils that overlie our limestone formations.

The alluvial soils are those that formed the flood plains in the basins of our creeks and rivers, and though many of the terraces on bottom

Digitized by Google

lands lying near the bluffs are far above high water mark of to-day, within a recent geological period they have all formed the bed of the rivers which at one time extended from bluff to bluff. The erosion of the river current through this alluvial deposit has left all the higher terraces above any floods of which we have a history. While some of these bottoms are mostly clay, many of them are sand and clay mixed, and there are not a few in which sand largely predominates. The constant flow of water from the whole country through the river valleys, and over these soils, has brought down, year after year, and age after age, the decayed vegetation of the whole river basin that was subject to deportation, and it has been deposited on, and commingled with the soils here found, till they are exceedingly well fertilized. The disintegration of the rocks that crop out of the bluffs often on one, and frequently on both sides of the streams, furnish the gravel, sand and fine silt, that are continually working their way during our floods down the streams; and where the lower bottoms are now occasionally overflowed this material is being deposited. Here we find the cottonwood, the honey locust, black and white walnut, the elms, soft maple, willows, and a great variety of other forest trees growing in luxuriance and abundance.

Our native forest trees, seem to select their habitat with as powerful an instinct, as do the native animals of our forests and prairies, and in this soil more of these trees find conditions favorable to their growth and reproduction than in any other.

On many of the upper terraces in our river valleys are found some of our best orchards, and the conditions of soil here are favorable to tree growth and fruit production with nearly all of our cultivated fruits. Here we find the wild grape in its most luxurious abundance of fruit production and wood growth, and here more frequently than elsewhere we find our best groves of the native apple and wild plum, and here too the White thorn finds a congenial home.

We have no soils that withstand the extremes of heat and cold, moisture and aridity better than do those of this alluvial character.

There is not a locality in our whole country, of an area equal to to the State of Iowa, that has a soil so well adapted to all the productions of the temperate zone known to agriculturists and horticulturists, as ours is. The ease and facility with which the subsoil takes up the surplus moisture of the soil itself, renders that soil quite susceptible to the rays of the sun and the warmth of the atmosphere, and therefore both late frosts in the spring, and early ones in the fall, are infre-

Digitized by Google

quent and those localities where the soil is thus drained the best, are more exempt from such frosts than others.

I cannot close this paper without adverting to a few facts that have come to my personal knowledge at, and near, Iowa City in connection with this question of drift soils.

Some thirty years ago in digging a well on section 15, township 79, range 6, at the depth of about forty feet a well preserved specimen of timber about six inches in diameter was taken out; about seven years ago a well was dug in section 9, in the same township, where at about the same depth well defined branches of trees from the size of a straw to a half inch or more in diameter were taken out, and this in earth that had all the black color and constituents of the top soil where the well was dug. These two wells were, one on the bluff immediately east of the Iowa river, and the other on rolling prairie three miles west of it.

About the same time I dug a well on my own land in section 16 in the same township, on a piece of bottom land about half a mile west of the river, where the surface was at an elevation of not more than twenty feet above high water mark in the river. It was dug to the depth of eleven feet; the first three feet were black alluvial soil, the next six feet were nearly all clay, when I struck a black soil not unlike that upon the surface, and in this I found a piece of wood about five inches in diameter lying in a horizontal position. After digging some two feet in this black earth I found the object of my search—a strong vein of water.

The question presented to my mind by these facts was this, have we had a former far remote period in the geological history of our country in which the constituents of the soil and habits of tree were similar to the present, and has the surface as it then existed been covered by a second glacial drift?

Digitized by Google

REPORT ON FORESTRY—NEEDS OF OUR PRAIRIE STATE.

BY F. W. HART, MT. VERNON.

Probably no question is fraught with more interest, at present, to the people of Iowa than that of forest or woodland culture. The subjects of internal improvement, commerce, manufactures, the development of our varied resources, etc., are all themes that claim our attention and enlist our energies; but equal to any, if not paramount to all of these, is the subject of arboriculture. The woodman's ax is felling our forests and woodlands with wonderful rapidity, and unless measures be adopted to prevent this annual consumption, or at least to repair the loss, the magnitude of our calamity no one can calculate. Twenty-five years will probably suffice to render the devastation of our forests complete, and their ruins and bleak plains may possibly take the place of what was once an inviting field for human effort and enterprise.

It may not be amiss here to refer to the experience made in this respect in other countries, both in ancient and modern times. The Bible speaks of the Cedars of Lebanon as large and beautiful trees. The country then supported a large population. At present, according to a recent report, only a few dwarfish trees are to be found, and the place of the once prosperous people is now occupied by wandering nomadic tribes. Spain, during the Roman Republic, was covered with majestic forests, and the Romans built their ships there, and the country was justly renowned for its fertility. The forests are at present mostly gone, and rapidly disappearing; agriculture is of little profit, and a poor, scanty population (about one-third its former number), now inhabit the peninsula. We read the same concerning parts of Asia Minor, Persia, Greece, Turkey, and other countries. The fertility of the soil has greatly diminished with the disappearance of forests, and where once were 300,000,000 of people living scarcely 50,000,000 can now be found. The experience of modern times in Russia, France, and some parts of the United States, like Ohio and Pennsylvania, is more convincing. In these countries where forests

Digitized by Google

were cut down without being replaced, as a natural result, the inhabitants now suffer from droughts, floods, the failure of crops, etc.

Shall Iowa repeat the sad history and make the fatal mistakes of other nations? or shall we imitate the wise example of Germany, and institute measures to inaugurate at once a judicious and extensive system of forest and woodland culture?

The benefits of forests and woodlands in any country are manifold; some of these I will proceed to enumerate: That forests induce additional rainfall, and exert a beneficial influence on climate and vegetation, there is abundant proof. Prof. Hinrichs, of the Iowa Weather Service, stated in his report of 1876 that the lines of equal amount of rainfall correspond very nearly with those of equal quantity of woodlands; and also adds that "those parts of the State which have a high percentage of forest surface are those that receive the greatest amount of rainfall."

Forest trees, evergreens, bushes, etc., growing in close proximity, are magazines of moisture, from which the atmosphere is constantly supplied with this commodity. The extent and distribution of our original forests were largely dependent upon the amount of rainfall and its due proportion during the several seasons of the year. All parts of our country are favorable to forest growth where these essential conditions exist. Yet from other causes, such as running annual fires, a region may not have borne trees within a recent historic period. Our prairies and bleak plains, stretching westward to the mountains may be included under this exception, probably.

The air holds more or less vapor in suspension, and this moisture precipitates in shape of rain whenever the air is cooled down to the degree of saturation. This process—and consequent rain-fall—is effected whenever volumes of air saturated with vapor pass over the cooling surface, which the presence of dense forests is sure to produce. Hence, our greatest rains generally follow the course of streams bordered with heavy timber. Also, every cause that tends to increase the humidity of the atmosphere, as well as to reduce its temperature, is likewise an evident cause of rain, and observations in countries where forests exist, prove that their presence has this effect.

Now, as the abundance and equal distribution of rain affect so materially the agricultural interests of our State, we readily see that the planting of trees is a question of vital interest to us, aside from its financial and economic consideration. Hence, I have enlarged upon the subject. Again: It is a matter of fact that streams diminish as

Digitized by Google

the woodlands are cleared away, so as to affect our manufacturing interests, depending on hydraulic power; also new sources of supply for our canals, as well as for our cities and towns are required. Many streams formerly navigable, are now worthless for that purpose. The reason for this is apparent. Dense forests prevent the rapid evaporation of rain as it falls, consequently a large percentage of rain and melting snow sinks readily into the earth, and reappears again in shape of springs and swamps, from which rivulets and streams often flow. Therefore, the removing of forests has the evil tendency above mentioned.

To the sanitary benefits resulting from tree planting, I will make brief allusion. A circumstance noticed at Palo, near the great city of Rome, illustrates the benefits of forests upon the public health. For years woodlands protected this town from the malarious districts of the south. This forest was cut down, and the once healthy hamlet was soon prostrated by the feverish winds from this pestilential district. Other towns suffered a like fate where the shepherds set fire to the olive forests adjacent.

An ancient writer relates "that the insolubrity of Rome was notably increased in the days of Gregory XIII, when a pine forest to the south was cut down, because infested by brigands." On the other hand, we read of the happy effects on healthfulness by the planting of trees.

A French writer makes mention of a noted city in Italy being surrounded by a fever-breeding district, the injurious effect of which was removed in part by a plantation of trees called Eucalyptus. Other instances of pestilential emanations from marshes being removed by planting trees are reported. The reason for this lies in the supposition that the atmosphere is purified by trees absorbing the humidity of the soil, and by exhalations from the leaves. Miasms are also condensed, while oxygen, liberated by the leaves, purifies the air. But I must not dwell longer on this interesting phase of my subject.

I doubt not but the "coming man" in Iowa will be enabled to so manipulate the forces surrounding us, as to effectually abate, if not remove, many of the evils now incident to humanity. Multitudes yearly would thus be saved from falling victims to their own ignorance and stupidity, and friends no longer would attribute (unwisely) their early demise to the sad dispensations of Providence.

Concerning the benefits of groves and timber belts to growing crops, and also to stock, I need scarcely speak. Experienced writers declare

Digitized by Google

that if 40 per cent of our tillable land were judiciously planted to trees, the remaining 60 per cent would produce more of all kinds of crops than the whole now does. Winter wheat along our timber belts is generally double what it is in sections more exposed.

In speaking of the influence of groves and belts of timber on growing crops, Judge Whiting, of Monona county, a man of large experience, states, that as his groves around his farm increase in height, he finds that the visible effect of this protection amounts, with almost mathematical precision, to one rod on the ground to one foot height on the tree. This opinion, from a man of 20 year's experience, certainly is entitled to our respect.

His extensive groves also afford adequate protection to his crops from the incursions of the grasshoppers. He states: "that during the grasshopper visitations of 1875 and 1876, his fields, surrounded by timber belts (whether from cause or accident), escaped almost uninjured."

Hon. J. G. Knapp, of Wisconsin, confirms this statement, by saying that the presence of forests not only intercepts the progress of insects, but prevents the spread of contagious and destructive fungi.

In Iowa the chinch bug destroyed in many localities last year, the entire wheat crop. The authority above quoted, declares that these pests can never traverse a belt of thick timber, seven or eight rods in width, to devastate an adjoining field. The cool, damp soil and shade of such a belt constitute an impassable barrier to their march. The value of crops destroyed the last few years by chinch bugs and grasshoppers, would be nearly sufficient to plant belts of timber around every farm in the State. Rust in wheat is a species of fungi, which in virulent form is borne on the wind and blights and destroys all grain with which it comes in contact.

A farmer in the east states that out of 200 acres of promising wheat growing on his farm, all were destroyed by rust, except those sheltered by woods.

The benefit of the presence of wood lands and timber belts to arrest the storms and blasts of winter is incalculable.

Timber for fuel and economic purposes is a question of immediate necessity. The profits to be derived therefrom, though somewhat remote, are none the less real.

Now, the necessity for planting being so imperative, what stimulus can we give to this enterprise. Our legislation on this subject has not been, thus far, very effective. It would be an unpardonable mistake

Digitized by Google

in a wise government not to provide, at whatever sacrifice, against a calamity consequent on the destruction of our forests, without affording an adequate remedy or equivalent therefor.

Our legislature has done something in this direction, but it should do still more. It is not sufficient that our laws exempt from taxation the sum of $100 for every acre of forest trees planted. If, in addition to this, we secure by legislative enactment a bounty of $2 or more per acre in cash for every acre thus planted, to be paid annually out of our State or county treasury, and also a bounty of $2 for every half mile of trees planted along our public highways, we would soon note their beneficial results. A few years would so thoroughly satisfy all of the benefit of arboriculture that we would no longer need the bounty as a stimulus.

Some States pay a bounty of $1 for each and every tree planted and properly cultivated along the public highways.

The exigencies of our case justify us in asking additional legislation in this direction.

The varieties of trees adapted to our climate and soil, together with their proper cultivation, will be themes for our future consideration.

DISCUSSION ON REPORT.

Mr. Lathrop: It is true that the area covered by tree growth in our older counties may not be increasing. But the climatic influence is in favor of the original bodies of timber with the undisturbed leaf-mould deposits. But the area of timber planting in the prairie countries will soon ameliorate climate by lessening wind sweep, and by giving off moisture to the air, rather than absorbing it as do our naked fields. I knew Grundy county, for instance, when it contained few native trees within her borders. Now it is dotted over with groves and timber belts. Already their influence is felt in the way of climatic modifications.

Mr. Speer: I hear that an effort will be made to repeal our present law framed with view to encouraging timber planting. The argument used is that it increases taxation. It seems to me we need reform in other directions. As an assessor I know that in our towns capitalists, large and small, evade taxation to a shameful extent. But the farmer has no chance of this kind. He must return all that he owns, to the last cent. Now the town men are after the farmer because he is exempted from taxes to a small amount on account of timber planting which is a public blessing. It is urged that as many fruit trees, and

Digitized by Google

as much timber, would be planted if the law were repealed. This is sheer nonsense, as is well known by every tree agent who has urged sales of trees to the prairie settlers. Of course they want the trees, but there is a tendency to procrastination, growing out of the many pressing wants of the new settler. The argument that their taxes will be lessened is a convincing one in such cases.

Mr. Potter, Adair county: I have no fault to find with the tree planting for economic uses and for shelter, but I object to the much talk about timber planting on the score that rainfall is increased.

Mr. Foster: The foliage of the trees give off moisture to the air. The trees also break up the prairie winds and thus lessen evaporation. In the early days, when the winds were totally unobstructed by fences, trees, etc., their force and even steady pressure was wonderful. There is difference between the effects of broken wind sweep and the unimpeded wind of the open prairie, where it licks up the moisture from soil and trees. But groves do not affect our annual rainfall. They only affect at best the lower beds of air, and have nothing to do with the great moisture-bearing currents which bring us our rains.

Mr. Watrous: We do not need to urge that our aggregate rainfall of the year is influenced by tree planting. But we need not go to the older sections of Europe or Asia for instances of change of climate wrought by denuding large areas of its native timber growth. Perhaps the rainfall is not lessened, but the streams dry up; the cultivated fields become less productive, and fruit-growing becomes more hazardous and difficult. The whole argument in favor of tree planting, in its climatic influences, hinges on lessened evaporation. Near my place we had, by a change in the roads, a row of large cottonwoods in the center of a street. The road here was forever muddy, and the trees had to be removed. If every farm of our State had its needed groves and shelter belts, the aggregate effect in the way of lessened wind-sweep and evaporation would ameliorate our climate to an extent difficult for many to believe.

Mr. Ireland: I wish to say a few words on best mode of starting trees. It is very important to have fruit and forest trees push freely from the time they are put out. Dr. Warder gave us a paper last year on what he called "schooled trees," meaning by this trees whose tap roots had been cut with view to rendering them easier to transplant. I do not like such usage for our climate. The tap root, that first goes down from the seed, should never be disturbed. Especially is this true of the walnut, the oak, and the ash. My walnuts starting from the

Digitized by Google

seed in groves are double the size of isolated trees transplanted. The walnuts, too, are benefited by planting an intermediate row of quicker growing timber to *push them up.* But, where nurse trees are used, they must unmercifully be cut and removed before they smother the more valuable trees. We do not regard the cottonwood as we formerly have done. Thousands of the trees are dying. The cause seems to be trouble with the leaf, as the effect of our dry, hot summers, or it may be the combined work of insects and fungi.

Mr. Dixon: One point in the essay deserves some criticism. That is the planting of trees along the public highways. This has been done to some extent in our section, and it is now condemned by public opinion. The roads are forever muddy where thus lined with trees. Of course, when the trees are young, as they yet are in the new counties of the northwest part of the State, this trouble is not apparent. But our friends of the newer counties should heed these lessons of experience. A neighbor has a hedge which he has allowed to grow up until it is twenty-five feet high. The road at this point is a mudhole about all the time. But I believe in the timber planting in its proper place. The argument in favor of increased rainfall is not easy to sustain. But all history gives examples of the sad effects resulting from great areas of country, remote from large bodies of water, becoming denuded of all timber growth.

Mr. Speer: I well know that our atmospheric moisture, giving us our rainfall, is mainly the breath of the ocean; yet we have reason to believe that large areas of forest may secure more rainfall in the way of summer showers than equally great extents of open plain. We often note this by observing the course of our showers along the timber belts of our streams. The aggregate rainfall of the State may not vary, but if one-half the State had a large per cent of timber and the other half about destitute, I am quite sure that the timbered half would get the most even distribution of rains, and most likely the largest annual aggregate in inches.

Mr. Beach: The air is the bucket in the well. The ocean is the well from which the original supply is drawn to feed our streams and refresh our trees and crops. But forests may equalize the distribution and even cause local rains in some conditions of the atmosphere.

Mr. Dixon: Theories will starve the hogs. We have no use for speculations when we have facts and figures. Prof. Hinrichs has for two or three years shown us plats of annual rainfall of the State. These plats show that the rainfall *does vary* in different portions of the

Digitized by Google

State. And they show, too, that the rainfall is heaviest where the timber area is greatest, and least where the timber supply is least. It is true that the aggregates vary in different years, or series of years; but we have the records of years to show that the timbered portions of the State are sure of the most liberal supply, whatever the annual aggregate may be. But our climate has been changing for the worse during the progress of settlement and culture of the prairies. Practically, in the early days, when the whole prairie was covered with a dense growth of grass, and the sloughs were clogged to an extent making them impassable, most of the season, the conditions as to holding the spring rains, and the rains of June, were something like those of the forests. The cultivated fields, the roads, and the pastures even, now deprive the air of its moisture, more especially in the spring, when the fields are yet uncovered with the growing crops.

Col. Scott: Individually life is too short for valuable observations on a subject of this kind. But we should not neglect the lessons of history. Climatology should be studied in our common schools. The oceanic climate may need to be little modified by tree planting. Indeed, tree planting in a climate so loaded with moisture as large portions of England, might be prejudicial to health and the crop products. So in portions of South America. But the intercontinental sections have in history gone up and down in prosperity with the rise and fall of timber areas. The dry, elevated plateaus of Spain, in the days of plentiful timber growth, were gardens of plenty. With the loss of great forests, her once fertile fields became literally parched deserts. The great plains of Asia have had a still more remarkable history. Perhaps it may be true that the aggregate rainfall is not lessened. But what does this matter? If sixteen inches of rainfall is enough, with conditions favorable to light evaporations, and forty inches fail to give us regular crop with a desert air, the lesson should be taught to every school-boy.

Mr. Wright: This talk is largely visionary. On our great northern prairies we can afford to talk tree planting from the common sense standpoint of shelter of our crops, our homes, and our stock from the relentless wind-sweep, and the equally important one of growing timber for economic uses such as fuel, fencing, etc. As to spending our time about the climatic influences, it is enough to say that our government gives in fee simple one hundred and sixty acres to any citizen who will plant a small portion of it to timber. Why? The answer includes all the points of this discussion.

Digitized by Google

Mr. Calkins now presented a specimen of live oak to the Society to add to its collection.

The Society now in Committee of the Whole proceeded to the inspection and testing of the pecks of apples on exhibition. On *eating apples*, the competition was between Jonathan, Grimes' Golden, and Fulton. Jonathan received fourteen votes, Grimes' Golden thirteen votes, and Fulton one vote.

There being three entries, a vote was now taken as to the relative superiority of the specimens, resulting in the award of premium to the basket entered by E. M. Guffin, of Iowa City.

The entries for the best peck of apples, profit alone considered, were all of Ben Davis. The basket entered by E. M. Guffin received the award.

Col. Brackett now reported from the committee on President's address and Secretary's report, that the matter of life membership was overlooked. The committee would now report in favor of the recommendation of the President relative to life membership. Upon motion the report of committee was unanimously adopted.

On motion the Society now adjourned to 9 o'clock in the morning.

Digitized by Google

FRIDAY MORNING SESSION.

Session opened pursuant to adjournment. Mr. Ireland introduced the following resolution:

Resolved, That the amount of $50 be appropriated from the funds of the Society, to be used under the control of the Committee on Scion Distribution, for the purchase and distribution for trial of Rocky mountain, and other promising new conifers.

Some discussion ensued relative to proposition of Mr. Douglas, of Waukegan, Illinois, in regard to furnishing plants of these new conifers at reduced rates for the purpose of having them tested in different portions of our State.

Resolution adopted by unanimous vote.

Mr. Speer now said that our fruit district reports, made annually by the directors, should include information relative to the behavior of varieties of all our fruits on varied soils. Every neighborhood in the State has experiences of this kind which would prove valuable if collated for publication.

J. L. Budd: I favor this suggestion. We should work unitedly in the way of systematizing our work for the general advancement of horticulture.

On motion the Secretary was authorized to print circulars, for distribution by the directors, with a view to eliciting information as to the relative success of varieties on different exposures and soils, and on all other points which in his judgment careful observations should be made in all parts of the State.

Motion unanimously adopted.

Mr. Foster now introduced the following:

Resolved, That it is the duty of the Society to caution our people against the deceptions and frauds of irresponsible tree peddlers, who are so numerous, and whose wrong-doings are so generally felt from year to year, and especially of late, in the sale of Russian varieties, either by name or number. As the greater number of the Russians have not yet been tested, therefore, neither this Society nor the Agricultural College can or does endorse them as reliable or valuable.

Resolved, That all Iowa nurserymen having agents in the field should furnish them either written or printed authority and hold themselves responsible for the acts of the agents, for the protection of buyers, and that our people be cautioned against buying of any agent who is not furnished with such authority.

Digitized by Google

Resolved, That this Society, as a Society, does not lend its indorsement to any vender of trees or plants, and that any vender claiming to have such indorsement is a fraud.

These resolutions drew out some discussion as to the relative value of cautionary notifications of this kind.

Mr. Speer said: Our work should extend to the education of those who put out trees and plants. We should have a more direct communication with the people through the press; very many of our papers have an agricultural column, but it is mainly filled with extracts from Eastern papers, not only useless, but actually in most cases misleading to novices. This Society should send out bulletins on matters of public interest weekly. I am sure these would be generally published. Last spring our resolutions relative to the tree peddlers appeared in every county in the State, and accomplished a good work. If we send out facts pertaining to modes and methods of orcharding, small fruit growing, and forestry, with careful instruction as to varieties, etc., in appropriate season, we would soon make our influence felt in the State. Our report is a good thing, but it comes into the hands of but few of the people we wish to instruct.

Mr. Ireland: These ideas are correct as to the diffusion of general information. But certain kinds of work should take precedence. First and foremost the people want cautioning against believing a word these traveling chaps may tell, unless he be backed by the certificate of a responsible nurseryman.

Mr. Wright: The impelling motive last year in sending out caution was not to say a word against the Russian apples and the trees grafted on crab roots. But we aimed at the spurious venders who were selling any trash they could get cheapest, by assuming that they were *Russian varieties on crab roots*. This was the special guise they then assumed, but these chaps are as changing as the spots on the sun.

Mr. Shaw: I have dealt with many nurserymen for many years, and I was never wronged out of a cent by them. But I have yet to see an honest itinerant tree peddler.

Mr. Patten: I am in favor of educating the people, but it is hard in these days to manage any kind of business at the West without traveling agents. Our best nurserymen are compelled to sell trees in this way, or abandon the business. The resolutions we passed last year *did seem* to reflect on the plan of grafting on crab roots which my experience has demonstrated to be a good thing for northern orchard-

Digitized by Google

ing. Perhaps they were not so meant, but practically they worked in this way.

Resolutions adopted.

A motion was now introduced instructing the committee relative to the distribution of the new Russian fruits. After some discussion it was laid on the table by nearly unanimous vote.

Mr. Wright offered the following resolution:

Resolved, That the counties of Audubon, Shelby, and Harrison be transferred from the seventh district to the third district.

Resolution adopted.

Gov. Gue now offered the following:

WHEREAS, A bill has been introduced into the legislature for the repeal of the excellent law enacted for the encouragement of forest and fruit tree planting, and believing that the repeal of that act would be detrimental to the best interests of this great prairie State; therefore,

Be it resolved, by the State Horticultural Society, That we earnestly protest against the repeal of a law that has done, and is doing, very much to encourage tree planting, the beneficial effects of which in the future can hardly be estimated.

Resolved, That a committee of three be appointed, consisting of the President, Secretary, and one other member of the society, who are requested to present a copy of these resolutions to the General Assembly with a concise statement of facts and reasons that may be given in support of the present law for the encouragement of tree planting.

Unanimously adopted.

Mr. Foster presented the following:

Resolved, That the thanks of this society be tendered to Peter M. Gideon, of Excelsior, Minnesota, for the specimens of beautiful fruit which he has sent here for exhibition.

Adopted unanimously.

Mr. John Smith presented the subject of exhibiting fruits by the use of cards of different colors on which to give names of the several varieties. These cards would show the committees at a glance the class for which entry was made.

On motion the subject was referred to the committee on nomenclature.

President Watrous now stated that the fruit casts, wood specimens, etc., belonging to the society were still in the Exposition building, owing to delays of various kinds consequent upon arranging terms with the Agricultural College.

The following resolution was now offered:

Resolved, That the Trustees of the Agricultural College be author-

Digitized by Google

ized, in their discretion, to remove the fruit casts and woods loaned them by the State Horticultural Society, on the terms last year agreed upon, and the same to be repaired at the expense of the college authorities, and that the work be done by Col. G. B. Brackett, or under his supervision.

Resolution unanimously adopted.

Mr. Dixon stated that the committee on nomenclature should try during the coming year to identify some of the stray fruits grown around Oskaloosa. Mr. Avey now has on these tables fifty-two varieties unnamed, and many of them are profitable and excellent fruits. The one we know as Black apple keeps until July. These varieties are found in the first orchards planted in the county, and it is supposed that many of them could be identified in Edgar county, Illinois, from whence it is supposed they came.

On motion Mr. John N. Dixon was instructed to forward specimens of these apples to Mr. Curtis, of Paris, Edgar county, Illinois, at the expense of the Society, for identification.

J. C. Smith now called the special attention of the Society to a sweet apple of fine appearance and excellent quality originating on his grounds from seed. This variety had been given the name "Nelly," and would be gladly distributed by him for trial on varied soils.

Mr. Speer made the special request that exhibitors of fruits and flowers correspond with him prior to the next annual meeting at Cedar Falls, relative to the amount of space they would need for exhibits. This would avoid confusion and delay, as all suitable preparations could be made in advance.

The following resolutions relative to "life membership" were now adopted:

LIFE MEMBERSHIP.

WHEREAS, It would add greatly to the usefulness of this Society to have more permanent memberships from year to year; therefore,

Resolved, That life memberships be created and the fee of such life members be fixed at five dollars.

Resolved, That moneys so coming into the treasury of this Society be placed at interest upon real estate security as a permanent fund.

J. L. Budd reported that as Secretary he had received many letters of inquiry relative to purchases from itinerant dealers. The inquiries relative to Russian varieties of the apple were most frequent. Copies of a circular giving descriptions of Russian apples were received in some cases like the following, received from Linn and Cedar counties:

Digitized by Google

HYBRID AND RUSSIAN APPLES A SPECIALTY.

Russian No. 1—Medium, whitish yellow with crimson stripes; juicy, tender, pleasant flavor, upright, moderate grower, very large leaves. Extremely hardy, and valuable north. July.

Russian No. 2—Large, very beautiful, crimson with bloom, juicy, hardy, productive, exceedingly showy, popular, profitable. Last of July and August.

Russian No. 3—Large, beautifully striped, tart, vigorous, immensely hardy, early and most profuse bearer. No hardier sort known. Most valuable variety for the north. August.

Russian No. 4—Medium, striped, good. Tree very handsome, upright, hardy. September and October.

Russian No. 5—Large, striped, magnificent, of good quality and extra for cooking and market. Hardy and fairly productive. September and October.

Russian No. 6—Medium and above, striped, beautiful, fine grained, juicy, good, hardy, productive. October.

Russian No. 7—White Astrachan, fruit good size, tart, small core, choice for eating, cooking or drying.

Russian No. 8—Medium size, crimson flesh, white, juicy, one of the best.

I need not say that all these representations are rank swindles, and that to fill such bills the cheapest trash of the eastern nurseries is often delivered.

FINAL RESOLUTION.

Resolved, That the thanks of the Iowa State Horticultural Society are hereby tendered the C., R. I. & P., the C. & N. W., and the C., B. & Q. Railroads for reduction of return fares to members of this Society.

Unanimously adopted.

On motion, the Society now adjourned to meet at Cedar Falls, on the third Tuesday in January, 1881.

Digitized by Google

DIRECTORS' MEETING.

ABORN HOUSE, DES MOINES, January 23, 1880.

Pursuant to notice the Board of Directors of the Iowa State Horticultural Society met at 2 o'clock, P. M.

President Watrous occupied the chair.

The following was offered:

We, the Board of Directors of the State Horticultural Society, recognizing the valuable services of Mr. C. W. Dorr, in reporting to the *State Register* the proceedings of our meetings, hereby tender him our thanks for said valuable reports.

Adopted.

President Watrous stated that he had been officially notified that the State Agricultural Society would recognize an Assistant Superintendent of Floral and Fruit Hall, at the coming State Fair, and also a Committee on Nomenclature, of three or more, appointed by our Society; also that these officials appointed by our Society would be announced in Premium List, and would be accorded the usual privileges of officers of that Society.

On motion, E. H. Calkins, of Burlington, was appointed such Assistant Superintendent.

On motion, the appointment of a Committee on Nomenclature was delegated to the President. This committee will be found on preliminary pages of this report.

On motion, it was ordered that the necessary expenses of such Committee on Nomenclature be paid from the funds of this Society, providing that said committee present at the next annual meeting a full report of the fruit exhibit, with accompanying notes on arrangement, misnomers, synonyms, etc.

On motion of director Speer, the following was adopted:

Recognizing the importance of the public Press of our State, we ask their assistance in disseminating useful knowledge pertaining to Horticulture, and hereby appoint the directors of the several fruit districts to prepare such information as may be useful to the general reader, for publication in their respective districts.

Mr. Lathrop, as delegate to the American Pomological Convention, presented bill of expenses incurred, amounting to $56.91.

Digitized by Google

E. H. Calkins, as associate delegate, also presented his bill of expenses, amounting to $39.40.

On motion, these bills were allowed.

On motion, it was now ordered that the Executive Committee design and order the manufacture of a suitable seal for the use of the Society.

On motion, it was ordered that additional premiums *may be awarded* on Flowers at the next annual meeting of the Society, if the Floral Committee may decide entries worthy of premium, which are not indicated in premium list.

On motion, adjourned.

J. L. BUDD,
Secretary.

Digitized by Google

Additional Essays, Reports, and Correspondence.

Some of the following reports were crowded out of their place on the programme for want of time, and were referred to the Secretary for publication; others were not received at the time of the Annual Meeting.

REPORT OF COMMITTEE ON POMOLOGICAL NOMENCLATURE.

BY COL. G. B. BRACKETT, DENMARK.

Mr. President—As the subject of my report is rather a dry one, though nevertheless important, I shall endeavor to be as brief as possible, and not weary your patience.

Having, in my last report, endeavored to show the importance of a correct Nomenclature in Horticulture, and some of the bad effects of a defective one, I will at this time simply call your attention to a few rambling thoughts in a different direction.

This Society is making a special effort to encourage the production of new fruits, and we are already beginning to see the results of these efforts.

At our last annual meeting, quite a goodly number of seedling apples were exhibited, and with the inducements which this Society offers these new fruits will continue to come before us, and it will devolve upon the Society to name them; and in doing this, there should be

Digitized by Google

some rules adopted by which to be governed, and it is upon this point that I wish to make some suggestions:

1. In naming a fruit, its very name should carry with it some apparent reason why it is so called.

2. The name should convey to our mind as much of the character of the fruit as possible.

3. We should use as many adjectives as possible consistent with brevity.

4. The name of the originator, the place of origin, time of ripening, size, color, flavor, or any peculiar characteristic should be taken into consideration.

When a fruit is once named by the Society and recorded, all former names should be dropped and never used as synonyms.

The American Pomological Society lays down as a rule, that the first recorded name of a fruit in any standard work shall be the true original name, and all others acquired afterward shall be known as synonyms. If this rule was universally adopted, it would greatly simplify our nomenclature and save many mistakes. If there is any one thing more confusing and bewildering in our nomenclature than another, it is in using the original name and synonym interchangeably, sometimes using the original for the synonym, and at other times the reverse.

In Chas. Downing's late work (of 1870) you will find the following facts in relation to synonyms: The Nickajack has 36 synonyms; McAfee's Nonesuch, 23; Ortley, 27; Buckingham, 24; Fall Orange, 21; Rawle's Janet, 16; Fallawater, 21; and so the list might be extended almost indefinitely. Here are seven varieties of apples with 168 different names. Now, is it any wonder that we become perfectly bewildered and discouraged in trying to master this perplexing subject.

I will notice another phase of the subject. Instead of many names for one variety of apple, sometimes we have the opposite, one name for many varieties; for instance, what a multitude of varieties has the name Sheepnose been made to cover? The Michael Henry Pippin, White Winter Pearmain, Red Stripe, Chenango Strawberry, and in fact most any conical shaped apple is called Sheepnose by some persons not familiar with names. This kind is often called for at the nursery, and it is sometimes quite difficult to ascertain what apple it is intended to designate.

We would call your attention to a new source of errors, which we believe will do much harm and add largely to our list of synonyms.

Digitized by Google

There is such a mania springing up all over the land for Russian varieties of apple, that unprincipled nurserymen and tree-dealers are taking advantage of it, and are palming off onto the unsuspecting farmer old varieties with Russian names applied to them to suit their convenience. The old, well-known variety, Alexander, strictly a Russian variety, and good in its place and season, but one of our oldest varieties, has been newly christened or altered by prefixing the word *Emperor* to it, thus leading some to believe that it is a new variety. It is being sold by a leading nurseryman at high prices. There are many instances where our old varieties are being sold in Kansas and Nebraska as Russian apples at one dollar per tree. I will notice but one more case of multiplying names; and that is the practice at our fairs, where premiums are offered for largest collection, plates of the *same apple* are exhibited under different names. At a county fair, last fall, I called the attention of one of the judges on fruit to this fact, but was simply met with the answer that "he didn't know one variety from another"; a truth which illustrates the lack of wisdom exhibited too often at our fairs in placing such men upon committees.

ADAPTABILITY OF PRAIRIE SOILS FOR TIMBER GROWTH.

BY PROF. J. K. MACOMBER, AMES.

A great diversity of opinion exists among our scientific men with regard to the cause of the treelessness of the western prairie. Before proceeding to discuss the nature of the prairie soils, I will briefly give some of the more prominent opinions respecting the origin of the treeless regions of the West. Professor J. D. Dana ascribes it to the scarcity of rain. As evidence of this he points to the fact that the constant increase of annual rain-fall as you go from the eastern prairie regions westward, is accompanied by a corresponding decrease in the timber area. The rain-fall of southeastern Iowa is about 44 inches, and there is a continual decrease until in northwestern Iowa it falls to about 28 inches, and continues about the same across the western

Digitized by Google

plains to the Rocky mountains. In the eastern portion of the State there is considerable timber, while in the northwestern part there is none worthy of mention. In Nebraska and Colorado there is very little timber east of the mountains. This connection of aridity with prairies has been traced much further by Professor Dana. It is found that a small annual rain-fall is accompanied by treeless districts in Utah, Oregon, Kansas, the Sandwich Islands, and in several of the South American States. As an offset to this it should be noticed that the amount of rain-fall upon the prairies of Illinois does not differ materially from that of the forest regions of Indiana and Ohio. And we might, it seems to me, very pertinently ask the question why it is not as reasonable to ascribe a lack of rain-fall to the presence of the prairies as the prairies to the deficiency of rain.

Professor Winchell thinks that the presence of the grasses and absence of trees is caused by a lack of the germs of forest trees when the waters which once overspread the prairie regions subsided. The seeds of grasses being lighter would be readily transported by the wind and first gain a foothold, after which forest trees would find it difficult to get possession.

Professor C. A. White, author of our latest Geology of Iowa, declares it to be his unqualified opinion *that the scarcity of trees is due to the annual burning of the grass by the Indians.* Perhaps in answer to this view it might be asked why the States of Ohio and Indiana should not have been similarly denuded of trees. Those States were also originally inhabited by Indians, who were familiar with the use of fire.

Among eminent scientific authorities who have given opinions as to the origin of the prairies, Mr. J. D. Whitney is the only one, to my knowledge, who has ascribed the existence of our prairies to the character of the soil. On this account I shall give his views considerable attention. In his opinion the theory of annual fires is wholly untenable. The prairies have been in existence as far back as we have any knowledge of the country. The treeless districts are limited to a peculiar region; one marked by certain well defined topographical and geographical features and not necessarily only where the Indians have roamed and used fire. The Eastern and Middle States were once inhabited by tribes not unlike ours in mode of life. Again, were the prairies once covered with trees, we should find near the surface indications of ancient forests. Such is not the case. Wood is rarely found, and when found, it is too far below the surface to belong to this

Digitized by Google

geological age. Mr. Whitney then says: "Taking into consideration all the circumstances under which the peculiar vegetation of the prairies occurs, we are disposed to consider the nature of the soil as the prme cause of the absence of forests and the predominance of grasses over this widely extended region. And although chemical composition may not be without influence in bringing about this result, which is a question for further investigation, and one worthy of careful examination, *yet we conceive that the extreme fineness of the particles of which the prairie soil is composed, is probably the principal reason why it is better adapted to the growth of its peculiar vegetation, than to the development of forests.* It cannot fail to strike the careful observer that where the prairie occupies the surface, the soil and the superficial material have been so comminuted, as to be almost in the state of impalpable powder. This is partly due to the peculiar nature of the underlying rocks and the facility with which they undergo complete decomposition, and partly to the mechanical causes which have acted during and since the accumulation of the sedimentary matter forming the prairie soils."

[See page 24, Hall's Geological Survey of Iowa, Vol. I.]

Instances are then given by Mr. Whitney of the thickly wooded regions of Michigan, and he states that the beds of ancient lakes, which are now dry, and whose beds are composed of the finest comminuted material, are now, and seem to have always been, devoid of trees.

I have dwelt quite long upon this because of its novelty and importance. If Mr. Whitney's opinion were the correct one then surely this would interpose an insuperable obstacle to the growth of forest trees in our State. In justice to Mr. Whitney it should be remarked here that the article quoted from was written about twenty-three years ago, and long before the successful attempts of the past few years in growing artificial forests. In order to see whether there is anything peculiar in our prairie soils I shall give analyses of several specimens. Professor Pope, of the Agricultural College, analyzed specimens of three soils, which were sent to the Centennial Exposition in 1876. The specimens selected were from the counties of Butler, Marshall, and Cass. The soil from Butler county contained the following substances:

Digitized by Google

Moisture	4.02	per cent.
Silicic acid (mainly sand)	69.80	" "
Oxides of iron, aluminum and manganese	14.56	" "
Lime	0.89	" "
Magnesia	0.67	" "
Loss on ignition (organic matter)	9.15	" "

The Cass county soil contained the following:

Moisture	3.60	per cent.
Silicic acid (mainly sand)	70.57	" "
Oxides of iron, aluminum and manganese	16.83	" "
Lime	0.77	" "
Magnesia	0.96	" "
Loss on ignition (organic matter)	5.62	" "

In the Marshall county soil a determination was made of several substances not sought for in the others. Marshall county soil contained as follows:

Moisture	4.51	per cent.
Silicic acid (mainly sand)	68.35	" "
Oxides of iron, alumina and manganese	14.40	" "
Lime	1.01	" "
Magnesia	0.65	" "
Chlorine	0.003	" "
Sulphuric acid	0.020	" "
Phosphoric acid	0.023	" "
Potash	2.02	" "
Soda	1.40	" "
Carbonic acid	0.61	" "
Loss on ignition (organic matter)	8.11	" "

In Professor White's Geology of Iowa, Vol. I, page 105, is given an analysis of the Bluff Deposit of western Iowa:

Sand (very fine)	82.15	per cent
Iron	3.89	" "
Alumina	0.67	" "
Carbonate of lime	9.60	" "
	96.37	

No determination is made of those elements which occur in small quantities, nor is there any note made of the organic matter. No mention is made of the physical condition of any of these soils as to fineness or coarseness. All of our prairie soils, however, are remarkable for the extreme fineness of their constituent particles.

Digitized by Google

The effect of the physical condition of a soil on its fertility is seldom sufficiently considered.. All soils have been made from disintegrated rocks. Hence they can contain only those elementary substances originally found in the rocks from which they have been formed. But the rocks may be found in the soil, and making up no inconsiderable portion of it, in all stages of decomposition, from the coarse gravelly soil to the one composed of impalpable powder. The soil serves not only as the mechanical support of vegetation, but also as the medium through which the plant receives its supply of water and gases which support growth. From ninety-five to ninety-nine per cent of the plant is derived from the atmosphere, either directly or indirectly. Nevertheless, a large portion of this is first dissolved in the water of the soil and thence carried into the plant where it is wanted. The plant, however, requires in minute quantities a large number of elementary inorganic substances, which are generally known as the "ash ingredients." From the best information at my command it appears to be generally conceded that there are few soils so deficient in any of the ash ingredients that they would not supply abundant food for the majority of plants. Especially is this true for plants like forest trees which send their roots deeply into the earth and far out in every direction. It is not unlikely, however, that in many cases the needed ash ingredients, while present in a soil, may be so combined chemically with other substances that they are not available for the use of the plant. Assuming that the conditions of heat and moisture are favorable to timber growth we are tolerable safe in saying that there are few, if any, soils in this country which will not grow forest trees.

From the report on "American Forestry," by Dr. F. B. Hough, of Lowville, New York, I shall make a few extracts on the kinds of soils most favorable for different trees.

The Beech, *Fagus*, requires a strong mineral soil, fresh and rich in humus. The Oak, *Quercus,* grows best in a deep, somewhat loose loamy sand, or sandy loam; but it thrives well on loam or sand. Although it prefers moisture, it will not grow in marshes unless drained. Its tap-root goes down five or six feet, so that the character of the subsoil is important. The Ash, Maple, Sycamore, and Elm are formed on similar soils. Ash requires a moist or even wet soil. A rich, loose, strong soil, abounding in humus, is best suited to it. The Elm thrives on a strong rich soil, rather wet, though not in a marshy district. The evergreens, such as the pines and cedars, are generally found on poor soils and mountain sides where the ordinary deciduous

Digitized by Google

trees refuse to grow. But it may be a question whether they occupy such localities from choice or from necessity, since they seem to thrive on rich soils if given proper care. So far as I can learn heavy growths of forest are as likely to occur on fine soils as coarse ones. The heavy timber of the Southern States is largely found along the Mississippi river on the exceedingly fine soils which are formed from the sediment deposited at the annual overflow of that river. The soils of Indiana and Ohio which originally supported forests are in many instances as fine as those of Iowa. It seems to me, then, that Mr. Whitney's theory of the cause of the treelessness of our prairies is untenable. The success which has attended the planting of trees in Iowa seems to indicate that all our native trees require is a little assistance for the first few years to make artificial forests a success. To scatter the seed upon the natural prairie sod would be useless. After the trees get a good foothold they seem able to maintain their ground; but they do not seem able, unassisted, to wrest the soil from our native grasses. After all, this may be sufficient to account for the fact that Iowa is a prairie State. For some reason, which we will not discuss here, the grasses first took possession and now they hold it. So far as we can see there is nothing peculiar in our soil which should prevent this State from growing forests as extensive and magnificent as any in America.

OUR MOST USEFUL BIRDS.

BY PROF. F. E. L. BEAL, AMES.

In the Horticultural Report for 1878, I made a few observations upon the value of some of our seed-eating birds, and endeavored to show that the good we received from these little creatures, was not wholly the result of insect destruction. I then remarked that it was the popular idea that only the insect eaters were beneficial to the farmer and horticulturist, and I may now add that but few are aware of the fact that a bird is not necessarily useful because his diet consists prin-

Digitized by Google

cipally of insects. There are several large families of insects of great value to men in the assistance they render him in his warfare upon the other and more hurtful ones, and it is as much for his interest to preserve these, as to protect the birds. Now when it is found that a certain bird feeds almost exclusively upon these useful insects, he can no longer be classed as a friend of man but, on the contrary, is one of his worst enemies, as such a bird will do him far more damage than if he ate only his grain or fruit. Professor Forbes, of Illinois, has made some instructive observations on this point and has brought to light the fact that the family of Thrushes, which includes such old favorites as the common robin, the cat-bird, brown thrush, etc., are engaged in such reprehensible work as eating up our predacious beetles, which, from the fact that they feed upon other insects more injurious, must be reckoned among our best friends. One peculiar point was also noted in this connection; that the amount of these useful insects eaten, was about the same throughout the season. However their diet might vary in other respects, in this it was nearly constant, which would indicate that the birds search for this particular food from a preference for it, and do not eat it simply because it falls in their way.

Such facts as these show that it is not safe to decide the bird problem from a mere superficial view of the birds' habits. The question is not one of insects *versus* seeds, but of good insects *versus* bad insects, and of good seeds *versus* bad seeds. The birds that feed upon these two bad elements must be protected, while those that destroy the good ones must be condemned, even though it be so time-honored a favorite as Robin Redbreast. But I do not wish to be understood as pronouncing the verdict against the robin as yet; the testimony is not all in, and it is too early to sum up the evidence. Further investigation may reveal the fact that he does an amount of good which more than counterbalances the evil, so that with all his faults we must love him still.

During the past season my attention has been called to another bird which seems to be presenting uncommonly strong claims to our gratitude. I refer to the Rose-breasted Grosbeak *(Goniaphea ludoviciana).* Several years ago, this bird was observed by Professor Bessey, feeding upon the Potato-beetle. Last summer, I had the pleasure of confirming his observations in my own garden. A female bird was seen to come many times during the day and carry off the beetles as if to feed a nest of young. The male was observed frequently, but the female was constant in her attentions and did good service. In *Forest and*

Digitized by Google

Stream of November 20, 1879, I find a note dated Coralville, Iowa, and signed "W," in which the writer says: "When the Colorado beetle created such sad havoc among the potato vines here in the West, the potatoes were uninjured in this vicinity for several seasons, owing to the kind offices of some beautiful birds. * * * Though they had previously visited and 'bugged' the potatoes on some farms located in the timber five miles distant, for four or five successive seasons, it was not until the summer of 1877, that they turned their attention to this place." A description of the bird follows, which shows that it is no other than the Grosbeak. This communication called forth several responses from which it appears that this bird has been seen at his good work in Minnesota, Illinois and Dakota. As the Potato-beetle is a comparatively recent comer in this State, it is of course new food for the bird, which seems to be just finding out this strange and abundant supply of provisions. It is to be hoped that this will prove one of those natural enemies to the insect which we have been looking for and which will in some measure restore the balance of nature which has been so sadly disturbed in the case of the Potato-beetle, for the last ten years. This bird is by nature a denizen of the forests and groves, and is chary of seeking for food at any great distance from trees, and it is no doubt for this reason that it has not already done more to check the ravages of the beetle.

In the summer of 1878, a small apple tree near my house was densely infested with the Aphis, the end of every twig being covered with them. I noticed a female Orchard oriole *(Icterus spurius)* visit this tree frequently, and was led to observe its movements more closely; for several weeks it came regularly morning and evening, the only times when I had a chance to see it, but I have no doubt that it was there several times during the day. By closely watching the bird's movements I was convinced that it was feeding upon the Aphides, and their gradual disappearance from the tree confirmed the supposition. As she always left the tree in the same direction I concluded that she had a nest of young, and from the constancy of her visits, that the plant lice were a favorite article of food; no general conclusion can, however, be drawn from a single case.

The preceding are but two examples of usefulness to which my attention has been particularly drawn. The great benefit which man derives from his feathered friends has been enlarged upon by so many writers that it has become almost trite, and he that runs may read; but there is a large class of persons who though they may run do not

Digitized by Google

read, and still must the story be told over and over again, and kept constantly before the people till they shall finally believe. It would seem that after the investigations of our ornithologists, the life of a bird would be held as sacred as that of a man, and the killing of one be considered as murder in the first degree—but, no, the Millennium is not yet, and the small boy still shoulders some antiquated fire-arm and goes forth to the slaughter of the innocents unmolested except when the said weapon of destruction happily kills in both directions, and justice is satisfied.

After the splendid work of Professor Aughey, in Nebraska, it would seem that we cannot safely say of any single species of bird that it is not or may not become useful to us. When the Rocky Mountain locust spread over the Northwest, all kinds of birds, without regard to previous habits, as Professor Aughey's report shows, at once turned their attention to these insects, and lived upon them, in nearly all cases principally, and in some almost exclusively; and in places where the birds had a fair chance, as in the vicinity of timber where they could nest, the insects were exterminated. This was not the work of the special insect-eaters, but of all kinds together: Warblers and woodpeckers, swallows and sparrows, owls and orioles, hawks and humming-birds, ducks and doves, and in short the whole feathered tribe. It is a matter of doubt whether we have a single species of bird which we can afford to have exterminated, though there are some, doubtless, that could be thinned off with little harm; but even in these cases it is probably because man has destroyed their natural prey so that they have been forced to seek other sources of food, that they have become a nuisance. In all of man's operations he disturbs that nice balance between the opposing forces of nature, in virtue of which each tribe is kept within proper limits, and this equilibrium once destroyed some species disappear and others are increased to superabundance, and consequently must open up a new source of food supply, and this is usually some of the cherished products of the farmer or horticulturist. Hence a hue and cry is raised and the creature is doomed to extermination.

Digitized by Google

CAN THE CLIMATE BE MODIFIED SUFFICIENTLY TO GROW THE FINER AND MORE TENDER VARIETIES OF FRUIT IN IOWA?

BY D. F. BRUNER, TOLEDO.

Mr. President and fellow members—It is well known to be unprofitable to attempt to grow the finer and more tender varieties of fruit and berries on account of our severe and changeable climate.

The severe heat in summer, cold in winter, and droughts in various parts of the season, are sufficient to kill most plants and trees that are less hardy than the common oak trees in our forests.

Are we then to abandon the raising of all the tender fruits and plants? or is it in our power to ameliorate our climate in the course of time so that even the peach will thrive in central and northern Iowa?

It is well established in my mind, that all trees, and especially evergreen trees, in winter as well as in summer are radiating heat and moisture, sufficient to dry the foliage and small limbs in a few weeks, if separated from the tree; also that evergreen trees are the most powerful barriers known to ward off cold storms from the north, in winter, and the heated winds from the south that blast and dry up our tender fruit in summer.

It is evident in my mind, that we can ameliorate and modify our climate by a united effort of all horticulturists and farmers in planting evergreen trees throughout all Iowa, Minnesota, Nebraska, and Dakota. Yes; let every tiller of the soil in the next ten years plant all the evergreen trees they can afford, and what a result! Let them plant judiciously in belts, along the borders of farms, along the roads and hill sides, on land too poor or inconvenient to farm, and along creeks, streams, and other nooks and corners. And then at the end of thirty or forty years from this time, will not the millions of evergreen trees over the northwest modify and even the temperature of our climate so that even the peach, quince, and most all our finer varieties of apple, pear, grapes, and berries, can be successfully and profitably cultivated?

Digitized by Google

Would not our children and even ourselves be amply compensated for our labor of tree planting? Would not our great northwest, judiciously planted with evergreen trees, be far more valued and welcome to the immigrant and those seeking investment of capital than at present, when these merciless winds, and blasting storms, sweep over our great treeless prairies?

In forty years hence contemplate the shade in summer and the shelter in winter for the accommodation of millions of school children.

In fifty years what a result! Pine trees 100 feet high, and large enough for saw-logs, timber plenty for building purposes and for fuel, shelter for birds, beast, and man. The climate modified so that severe storms and hurricanes would be among the bygone events. What an æsthetic influence on the future inhabitants! Who would not then be patriotic and love his own country above all other lands?

A few words in relation to the best varieties of evergreen trees for Iowa, or rather central Iowa. And just here let me say that it depends greatly on the soil, situation, and locality, and, above all, treatment while young, in order for evergreen trees to thrive well.

The Norway spruce, Balsam fir, White pine, Scotch and Austrian pine, and the American Arbor Vitæ, are perfectly hardy in most parts of Iowa, and I consider them all very profitable for shelter, timber, fuel, and ornamentation. The Red cedar, Irish juniper, White spruce, and many of the newer evergreen trees on trial, are hardy in some localities, but for general planting are not to be trusted as yet. But in a few years more many more varieties may be considered hardy.

SOME NEW OR LITTLE KNOWN PEARS.

BY. E. Y. TEAS, DUNREITH, INDIANA.

I have long believed that valuable additions to our lists of pears may be found in some varieties, which though not of the greatest excellence as dessert fruits, are nevertheless unsurpassed for canning and preserving; varieties uniting these desirable qualities with great pro-

Digitized by Google

ductiveness, and almost absolute hardiness and health of tree. In pursuance of this subject my attention has been called from time to time to a race of pears, not at all new, but which have not received the attention from cultivators, that their merits demand, because I am convinced that we may reasonably expect to obtain seedlings or hybrids from these, rivaling the Bartlett or Anjou in quality, and that will at the same time, be exempt from blight or other diseases. I refer to the Chinese and Japanese pears, of which several varieties are in cultivation in this country.

The late Wm. R. Prince, of Flushing, New York, imported from China, some fifty or sixty years ago, the Sha-lea or Sand pear, so called from the gritty or sandy substance mingled into the flesh, and the Seut-lea or Snow pear, from the white appearance of the flesh. These are believed to have been the best varieties of pears known to the Chinese.

These fruits are large and as golden as large oranges, possessing also an agreeable flavor, with a delightful perfume, and although they never become mellow, and toothsome as our best pears do, they are unsurpassed for canning and preserving. The trees are remarkably vigorous, perfectly healthy, and entirely free from that terrible scourge the blight. The leaves are two or three times the size of our common pears, and so thick and leathery that they stand the extreme heat and drought of the south, and southwest, and from some experiments they are found to be hardier in the north than our common pears are. The fruit which is as large, and much the shape of an Orange quince, ripens in this latitude in September and October, and is so firm that it may be shipped from our central States, to the principal European markets without loss, and I am confident that when the merits of this fruit become known, it will command as high prices in our own, and foreign markets as the best pears do. This is the experience of cultivators in New York, Pennsylvania, New Jersey, Delaware, Maryland, and other States where either the Sand pear or Snow pear are cultivated.

But it is from seedlings or hybrids from these that we expect the greatest results; and already several choice new varieties have been produced. From the Sand pear we have the Le Conte, a very fine early pear whose origin is unknown. It was carried from Philadelphia to Georgia by Major Le Conte, about twenty-five years ago, and has given great satifaction wherever grown. The tree is as vigorous and healthy as a cottonwood, and an early and abundant bearer; fruit as large or larger than Bartlett, and ripening at the same season, and so firm that

Digitized by Google

it may be shipped to Europe with success. This fruit brought higher prices in the New York market the past two seasons than Bartlett. Some persons think the Le Conte only excelled in quality by the Seckel.

Keiffer's Hybrid is believed to be a cross between Sha-lea and Bartlett. This is another very large pear of the greatest excellence, ripening in October. This variety attracted attention at the Philadelphia Centennial, where in competition with the very best, this received the highest commendation.

Cocklin's Hybrid is a cross between Sha-lea and Louise Bonne de Jersey. It is as large as Keiffer's Hybrid, and is by far the handsomest pear of any season or clime I have ever seen. This ripens in September. I have kept it till January.

Garber's Hybrid is also a seedling of Sha-lea crossed with some one of our common varieties. This is a very good October pear, of medium to large size, and it keeps well after being picked from the tree.

There may be other seedlings from the Sand pear in cultivation, whose merits entitle them to mention here: but those named are of such value and promise as to lead us to expect an impetus to pear culture, and success in it never before attained in America.

I found last summer, in the latitude of central Indiana, a tree of the Seut-lea, or Chinese Snow pear, twenty-eight years planted, that was thirty-five feet high and the trunk eighteen inches in diameter, vigorous and healthy, and bending under its load of golden fruit. It formed a picture of rare beauty. This tree is nearly surrounded by pear trees of the common cultivated varieties, and the seedlings from the Snow pear indicate by their appearance that they are hybrids.

I saw near one hundred of these seedlings in bearing, and the fruit was generally of fair to good quality; some as large, and resembling, Duchess de Angouleme, and several that will attract attention where known. None of these, however, are yet in commerce.

The Japanese pears resemble the Chinese, excepting that the foliage is deeply serrated, and the fruits almost invariably apple-shaped. I have not been able to learn when these were introduced into the United States.

We have now the Mikado, Von Seibold, and Hawaii. I do not know of any hybrids having been produced from these, but I have no doubt they will cross with our common pears, and they are decidedly hardier than our most prized sorts, and also entirely free from blight or other

Digitized by Google

diseases. Efforts will be made to produce from these, varieties yielding fruit of better quality.

The trees themselves of both the Chinese and Japanese pears, from their vigorous, upright growth, their large, striking foliage of deep green, silver and bronze, and their large orange-colored fruit in summer and autumn, are entitled to a place among our choicest ornamental trees, either for the lawn or garden.

WHAT HAS BEEN THE LOSS TO THE STATE BY PLANTING ORCHARDS WITH VARIETIES LESS PROFITABLE THAN OTHERS?

BY HON. SUEL FOSTER, MUSCATINE.

Mr. President and fellow members — This question cannot be answered definitely; we can only estimate and approximate.

The first farmer that I interviewed on this subject, James Cattell, said he had one row of ten trees of Willow Twig that produced more fruit than one hundred other trees in his orchard.

If the ten Willow trees produced one hundred bushels, and the remaining one hundred trees one hundred bushels, his loss was nine hundred bushels, which, at thirty cents per bushel, would amount to $270. Ten bushels per tree is too large an average for several years together. But there is a cost connected with the plowing and general care of one hundred trees, and ground rent of two acres, which will make the actual loss about two dollars per tree at a reasonable estimate.

I have the census report for the State of Iowa for the year 1874, giving statistics of orchards in our oldest countries, including the products of that year, which I believe was a productive one. The yield fell below one bushel to the tree in every county but Lee, which is reported slightly over one bushel; while Des Moines county, the next highest, is slightly less than one bushel to the tree. Of course, in

Digitized by Google

most of our counties many orchards are too young to calculate on a good average crop.

I have taken this census report and added the number of trees and the number of bushels of fruit of the crop of 1874, in the counties in the third tier from the Mississippi river, which I regard as a fair average for the east half of the State. These counties are Davis, Jefferson, Keokuk, Johnson, Linn, Benton, Buchanan, Bremer, Chickasaw, and Howard. Number of bearing apple trees, 407,272; bushels of fruit, 207,402. It will be seen, that gives a trifle over a half bushel to the tree.

It is probable that the ten Willow Twig trees in Mr. Cattell's orchard estimated at ten bushels per tree, would in practice come near five bushels as a general average. This gives a difference of four and one-half bushels in favor of our best bearing varieties, of which our farmers have so small a proportion in their orchards. This estimate gives a total in the fifty counties in the oldest eastern portion of the State of 3,163,620 bushels, which, at fifty cents per bushel for best winter apples, gives an annual loss of $1,581,810. If fifty cents is too high, and we estimate at twenty-five cents per bushel, we yet have $790,705!

We have met here to see what we can do to stop this annual loss in the east half of our State, and to tell the west half to reform and to plant more sensibly than we have planted. Let the unproductive, unhealthy, short-lived, winter-killing sorts alone.

It will be asked why I take the Willow as a standard of productiveness. I have only given it as an example. With the experience I have had I should take the Oldenburg and Ben Davis in preference to the Willow or any others. I have tried to be faithful and earnest in keeping our list of varieties confined to a select few, and I think there are very few horticultural societies who have recommended to the public a more select list than has this Society, and yet, with all our aptness to learn, we have lately got the Oldenburg which will bear five times as many apples as any other summer variety we have. Yet in the "American Orchardist," published forty-seven years ago, we are told "It is valuable for table or for sauce; grows well, and bears well." And of the Borsdorfer (Borsdorff of Lindley) Kenrick says: "This fruit is a delicious German apple of large size, beautiful as the Canadian, and in size and form like the victorious Reinnette." How late an importation does Dr. Hoskins say this variety is? I refer to this old fruit book to show that we had omitted some good things in

Digitized by Google

our beginning, and I wish to say to Prof. Budd "Prove all things and hold fast to that which is good" only. I believe we have held fast to too much. But we have repented of our wrong-doings and are fast mending our ways. We look to the Experimental Horticulture at the College Farm as the best guide, with the wide experience of the members of this Society, to lead us in the work of improving in Pomology to keep us, if not in advance, at least in line with the foremost of our Western States in presenting to the public a list of trees and fruits that will redound to our credit; and that our draft of $1,000 per year on our State Treasury will be honored with pleasure by the people.

But let no one imagine that we have completed our work. No! not as long as any institution in our State, or the State itself, exists will the patriotic and praiseworthy work of planting trees be finished.

In regard to the Russian varieties, they have a good reputation, but as yet they are introduced without any experience in regard to most of them. We ought to be cautious. We should naturally have more confidence in our native American varieties, such as Rhode Island Greening, Roxbury, Russet, Baldwin, Newtown Pippin, Bellflower, etc., which our first orchardists planted with good success in some few instances, but the general experience is against them and they, and and their class, are now mainly discarded for western planting. But what assurance have we that this innumerable host of Russians will prove better? Our trees have other qualities than those which the tree peddler puts upon them as No. 1 Russian, No. 13 Russian, etc. They must prove more than Russian importations, and possess other qualities besides mere hardiness, other qualities than having entered on their college course at the College Farm. They must graduate before this Society can give them a diploma. And we beg of the Professor of the Horticultural Department, and the Trustees of the College to be cautious and subject them to trial and not repeat our experience with the eastern varieties, with the immense loss, vexation, and discouragement. We have natives of Iowa and of all our Northwestern States, and in the name of common sense let us make haste cautiously and slowly.

Digitized by Google

LETTER FROM A. G. TUTTLE.

BARABOO, WISCONSIN, January 11, 1880.

J. L. BUDD—*My Dear Sir*—Yours of 3d is received. My Tetofsky seedlings are most of them very good growers; more of them have the appearance of crabs than common apples. Several of them fruited the past season. One of them bore fruit later in season than Transcendent and larger; fruit as handsome as Montreal Beauty and crisp, juicy, and pleasant as an eating apple. The others were late, larger, and all of them better in quality for eating than Tetofsky. Not one of them has ever shown the least tenderness. I gave several of them to C. G. Patten, of Charles City, Iowa, a year ago last spring for trial, and should be glad to give away more of them. I hope some of them may show more of the apple than the crab, as I have no faith in setting orchards to crabs when I can get the Russian apples.

The new Russian apples, so far fruited, have more than met my expectations, and should we not find another apple of value among the large list yet to be fruited, we have already a list covering the whole season from very early to very late equal to Duchess in hardiness, and far better in quality.

For a description of the new Russians that have fruited, I refer you to the catalogue. Belle de Boskoff does not appear like a Russian. Mr. Downing informs me that it is a German fruit. I have no Russian so unsatisfactory in tree. Charlamoff will not be in the catalogue. I have just been eating a specimen and compared it with Walbridge and find it far better. In form and color it is similar to St. Lawrence. The flesh is fine in texture, juicy, and apparently it will keep until spring. In quality it is much like Dominie.

It is about fifteen years since my attention has been given to the fruits of Russia, and our first scions from Moscow and St. Petersburg were received. I have never lost faith in them, but am surprised at the results so far, as we have been told by "knowing ones" that nothing of value would be found among them. I am not much of a Methodist, but I feel like shouting even now, before the trial is half over. I sent some of the new Russians to Winnipeg last spring, and if they mulch them to prevent root-killing, I have no doubt they will winter well, though the mercury reaches sixty degrees below zero.

I know very little of the list of apples you presented for my opinion, except Kellogg Russet, Fall Spitzenburg, and Pewaukee. Kellogg Russet bears fruit much like Golden Russet, but the tree is more upright in growth and hardier. Fall Spitzenburg is a profitable market apple; a great bearer and well adapted to sandy soils. Pewaukee for this region as an orchard tree is all right.

A crab must be of good quality and extremely beautiful to be worth anything. With regard to your question as to growth of the new Russians, and their comparative vigor and hardiness, I will write you at another time.

Yours as ever in the fruit interests of the Great Northwest.

A. G. TUTTLE.

Digitized by Google

DESCRIPTIONS OF VARIETIES OF RUSSIAN APPLES OF THE IMPORTATION OF 1869-70, WHICH HAVE FRUITED IN NORTHERN ORCHARDS.

BY A. G. TUTTLE, BARABOO, WISCONSIN.

Yellow Transparent—Earlier than Tetofsky, and of better quality.

White Transparent—Decidedly the most valuable early apple yet tested; ripens with the Red Astrachan, and is of much better quality. Its fine size, quality and beautifully transparent skin, makes it probably the best early market apple.

Lowland Raspberry—A very handsome apple, similar to the Red June in quality; season September; would take the place of the Autumn Strawberry.

Vaselest Largest—Similar to Alexander in size and color, but of better quality; season September and October.

Longfield's apple—Tree spreading and a rapid grower; fruit about the size and season of the Fameuse; quality as good.

Borsdorf (No. 402)—A long keeping winter apple of finest quality; size above medium; obscurely ribbed; skin smooth and glossy green, with brownish red cheek; flavor much like Peck's Pleasant; keeps till June.

Hibernal Apple—Tree a splendid grower and early bearer; an acid apple of good quality; a good keeper; large as Rhode Island Greening, and would make a good substitute in size, color and flavor.

Red Duck—Tree very hardy; upright; very profuse bearer.

Charlamoff—Equal to Duchess in size and beauty; keeps through winter; quality like Dominie. (See note in above letter.)

Zolotorff—As large as Alexander and similar in quality; very early bearer.

Switzer—Good size; remarkably handsome, and of a spicy, quince-like aroma. Downing says, "it is undoubtedly valuable for home use or market."

Digitized by Google

Charlottenthaler—Fruit large, white, sub-acid; very tender and good; tree one of the best for hardiness, vigor, and productiveness; valuable.

Enormous—Fruit very large, beautiful, and of good quality; a week or ten days later than Red Astrachan; it gives high promise as a market variety.

Red Wine—Of good size and quality; season September.

Repka Malenka—Size of Ben Davis; quality like Walbridge; one of the best keepers known; fruit not fully matured the 23d of May.

Lubsk Queen—A wonderful beauty; *sweet;* quality not high; tree very fine.

White Pidgeon—Not large, but of excellent flavor.

Prolific Sweeting—A rich, sweet apple; season September.

Heidorns Streaked—Seems to be a model apple, of good size, fine form, brilliant color, good cooking quality, and of firm texture.

Imperial Citron—Of good size, fair quality, and ripens with Duchess.

Burr Apple—A large apple; clear white when matured; season September.

Moscow—Tree a rapid grower, and is a very early bearer; extremely hardy and suited to all soils and the most unfavorable locations; fruit medium, tender, juicy, good eating, and most superb cooking; season August and September.

Red Queen—Tree perfectly hardy; a late keeper of excellent quality; foliage very backward in spring, blossoms showing before leaves.

NOTE BY THE SECRETARY—The above notes are given to show that out of 24 varieties fruited at the north, of the importation from St. Petersburg, we have varieties beyond all doubt hardy in about any prairie situation, which furnish fruit in succession through the year, of which five are good keepers. It is worthy of note that five which have fruited are listed by Dr. Regel as winter varieties in the Russian interior where the summers are long and hot enough to mature them.

Digitized by Google

REPORT OF COMMITTEE ON SEEDLING APPLES.

BY G. A. KNOWLES, LA PORTE, IOWA.

Mr. President and members of the Iowa State Horticultural Society—The task imposed upon me of writing up seedling apples, opens a subject of so much magnitude and importance, that I feel inadequate to do the subject justice. And when I reflect that, but a few years since, an honored director of our society assailed me in print, using as a medium our county papers, for advocating the planting of seedling trees, locating me "forty years behind in horticulture"; also, that on page 11, in your report of 1878, you refuse to recognize seedling apples as fruit, except by especial indorsement and designation, you may well imagine the embarrassment that I have to contend with, and I would certainly shrink from the task imposed if I had not something tangible in the shape of *fruit* to back me up in my assertions. And here let me suggest, would it not be better to recognize fruit in a worthy apple, or one of good size and quality, and fine in appearance when picked from the parent or original tree, as well as when grafted on some worthless stock from one to one thousand times? for in root-grafting you cannot tell whether your stocks are good in quality, or inferior, and I apprehend it makes little difference as the fruit seldom varies in quality, whether grafted on a good or poor root. If the root affects the fruit, so much more need of recognizing fruit in the apple from the parent tree, before running the risk of deterioration, from an inferior root.

Another point is here deserving of our notice. What is the reason that most of our old and famous apples are nearly or quite worthless in this vicinity, and that none of them are equal to the Dyer, or Early Joe, or Northern Spy, or many others of our newer seedlings. Are the old varieties running out, or are we improving by planting seedlings? In either case the importance of the seedling is manifest.

Another point. Seedlings have invariably given better results, especially the past year, than any grafts in the north part of the state.

Digitized by Google

But we cannot be too careful in the selection of seeds for planting, as seeds from inferior apples may not be expected to produce fruit of much better quality than the apples from whence they were taken. And much of the seed planted has been procured by washing, from pomace, at some cider mill, where the refuse apples are made into cider. But with a careful selection of seeds we have accomplished results that are entirely satisfactory, having produced varieties that are as good as the Rambo, or Mother, and as good to eat as the Rhode Island Greening or Northern Spy, and will return more money from an acre than the Ben Davis. But, says one, why are they not on exhibition here? Suffice it to say, that while they are under condemnation by this Society, and not recognized as fruit, or allowed to enter the field of competition on their merits, we choose to hold them in abeyance for further consideration.

By reference to the *College Quarterly* we see that trees of some of our new varieties are on sale without our consent. We hope they have not been grafted on inferior roots, so as to deteriorate them to such an extent as to injure their prospects for future popularity. The tree that produced the premium apple of last year has stood for thirteen years in ground in constant cultivation, with frequent manuring, without the loss of a limb, or any other blemish, giving annual crops of fine apples, but never so fine as the last year, and are now in good eating condition, with the quality of the Swaar, and twice its size. I have also a seedling Northern Spy that is so near the parent apple as to show plainly its paternity, but a more abundant and much earlier bearer. I have many others that I need not mention here, but when you give an opportunity to exhibit them on their merits, in competition with the most popular grafted fruit, you may expect to see them contending for the honors.

NOTE BY SECRETARY — It is true we have a very few trees of several varieties of Mr. Knowles' seedlings to send out for trial. This was the intent of the Experimental Station. Only in this way can the merits of the variety be generally known in our State in a generation. Testing in one locality does not warrant placing any variety on the recommended list of the State Society.

Digitized by Google

REPORT ON TOP-GRAFTING.

BY M. PUGSLEY, WOODBINE.

Mr. President and fellow members—I have for several years given the subject of top-grafting considerable attention. Our climate is too severe for profitable growing varieties of the apple not quite hardy when root-grafted, yet too good to be spared from our list. Experience has fully proven that a tree is more frequently injured in the body, and in the forks of the branches, than at the extremities of growth. Therefore, if a tender sort be grafted on the limbs of a hardy stock it will better endure our climate.

Again, some sorts make poor roots. The Winesap is a noted example. It is claimed that a vigorous rooted stock is a decided benefit to such varieties. In other cases a variety may be rendered more fruitful by grafting it on a stock for which it has not a perfect affinity. The Tetofsky top worked on Transcendent crab is an example of this.

Also, a variety may be so crooked and ugly in habit of growth as to be materially benefited by working it on a straight vigorous stock. The Early Joe is a good example. But all these cases, where top-working is an undoubted advantage, do not include the few varieties that we have which are all right in every respect when root-grafted, such as Oldenburg, Wealthy, Plumb's Cider, and Gros Pomier. Such varieties must furnish us the stocks on which we must work the less perfect varieties in habits of tree. The evidence continually accumulates favoring the idea that the feeble-growing varieties are benefited by working them on vigorous hardy stocks. The Delaware grape, for instance, bears more, and better, fruit when grafted on the wild vine. We must learn these things by continued trial. If we attempt to reason out the behavior of a certain scion on a certain stock we will often be found wide of the mark. The Gros Pomier is often recommended as a stock, yet we find an occasional variety that outgrows it a little, as the common apple outgrows the crab stock. We have in our section a variety of the apple coming from the east, the roots of which run near the surface and send up sprouts like the Morello

Digitized by Google

cherry. The people here have gathered these sprouts and put them in the orchard, but their hopes have not been realized in the way of crops of fruit. They are now being utilized as stocks. On this stock the Yellow Bellflower has borne fine crops of fine fruit. The Red Astrachan has also borne well on this stock, while as a root-graft it is unfruitful here.

In view of these facts, it occurs to me that we should experiment more in this direction. I am quite sure that we can secure a model orchard about anywhere in this State, but we must double-work some varieties. Perhaps when we can grow our seedlings from seed of the Russians we can safely use seedling stock; but, until then, we must use our iron-clad varieties for stocks, as propagated by root-grafting.

The influence of the stock on the graft is as yet so little understood, that systematic lines of experiment should be instituted. I have commenced an experiment of this kind which will require several years to complete. I have planted stocks of great divergence in character, putting three rows of a kind; these I propose to top-work with desirable sorts in rows running across the rows of stocks. With the same variety on diverse stocks, I think some lessons may be learned.

Before commencing this experiment, I wrote to Prof. McAfee, and received the following reply:

Yours of August 14th is at hand. I have delayed answering a few days that I might be more certain in my answer. I have known of many experiments, which in aggregate go to show that the stock has some influence upon the graft. The influence in these cases seems to be to modify either size or flavor, or both. I know an orchard where many varieties are top-worked on common crab apple. The influence of the stock in this case has been throughout to decrease size, and modify flavor; the fruit seeming more acerb, and in other ways inferior. I grafted a high-top sweet into a crab, and the fruit was always small and inclined to acidity. In another case my father grafted a Canadian Wine scion upon sweet and sour varieties standing near, thereby producing two apparent varieties from one scion. The fruit from one was larger than the parent, while the other was smaller.

Benjamin Hoge, of New York, thought it entirely impossible that the two scions used could have come from the same tree. But the subject of mutual influence of scion and stock is too extensive for a letter. Suffice it to say that there is plenty of experience to give color to the theory that they mutually modify each other to greater or less degree; hence it is worth while to experiment, that we may obtain more knowledge. Such experiments should have been undertaken here long ago. * * *

I think, from the experiments I have observed and heard of, that varieties used as stocks, which have a free growth and produce large sized fruit, will

Digitized by Google

have such an influence on the scion as to produce large fruit, while stocks bearing small fruit will modify the products of the scion in the direction of small fruit. I think, farther, that a tart variety grafted on a sweet stock will at least lose its sprightly flavor, and a sweet variety grafted on a tart-bearing stock will be less sweet. And yet I do not think that an appreciable difference in size or flavor can be always observed.

I think your plan of experimentation is admirable, and hope you may be enabled to carry it out in all respects. I will only suggest that you add a hardy sweet apple, like Talman, to your list of stocks, and one or two sweet apples to your list of scions.

Yours, respectfully,

H. H. McAfee.

I will only add that the orchard referred to in this letter, consists of three rows each of Talman Sweet, Gros Pomier, Oldenburg, Soulard crab, Transcendent, Hyslop, and Siberian crabs. In each row is planted twenty-five trees. By grafting across the rows, I will have the same variety on three trees of seven kinds of stocks.

NORTHERN ORCHARDING.

BY EDSON GAYLORD, NORA SPRINGS.

Mr. President and members of State Horticultural Society—In reviewing my article of last winter in your report, I find myself misquoted. The first error is found in the three last lines on page 61. I am there made to say that "our old trees are all open on their south and southeast sides." I wish it distinctly understood that among the many thousands of old trees I have examined, I never saw more than one tree standing erect that was injured on the southeast side, and this one very slightly.

All trees standing erect with like protection will show a dead line, if at all, up and down the tree just where the sun strikes the tree *from half past twelve to half past one.* But I find that the course of this dead line corresponds with the slope of the tree. To illustrate: I have lately discovered a Talman Sweet, some fifteen years old, set and trim-

Digitized by Google

med after friend Foster's ideal plan, five feet high, and which by some cause to me unknown now leans to the northwest, and has its dead line running up the trunk from the southeast to the northwest. This was evidently done through the influence of the sun at about eleven o'clock which struck it at that hour the most directly it could at any time during the day. Another tree in the same grounds, leaning to the northeast, shows a dead line running from the southwest to the northeast. In this case the death stroke was evidently given at about two o'clock. Another tree in the same grounds leans directly north, consequently its dead line runs up the tree from south to north. You will not wonder at these trees leaning and dying as they are, when I tell you that these trees were grown by the father of that brother-in-law referred to in my article of last year, on page 61. *"Father, like son," would have his own way.* "The son, like father," will live to see *his* trees leaning and dying in the same manner.

I wish in part to repeat in a few words here some points I deem of importance to all trying to grow sound, healthy apple trees in northern Iowa:

Where the soil has not been, just previously, *thoroughly* worked, I dig my holes the size of the fore-wheel to a common wagon, from four to ten inches deeper than the tree stood in nursery, taking care to give the bottom of the hole the proper slope, so that when the tree is placed on the bottom of the hole it will have its necessary slope. I find, by experience, that this retains the tree in the desired position with much more certainty than having the bottom of the hole made level. Set your trees, in northern Iowa and Minnesota, leaning at an angle of about fifty degrees toward the one o'clock sun, taking *special care* to point the thickest and heaviest branches in the same direction, and then trim off and thin out all the limbs you can find the courage to from the northeast side of your tree; close up all openings possible on the south and southwest side by clipping the twigs just above each available bud that points toward the opening; doing this *thoroughly* you will soon have a valuable self-protected tree worth ninety-nine trees leaning to the northeast and open on the south or southwest side. I claim that all the above precaution is absolutely necessary in making a success of our apple trees, except *a very few* of our iron-clads, *and even they will not flourish leaning to the northeast.*

I find now and then my young trees more or less bound to go off to the northeast. I dig them up and turn them right the reverse; to my

Digitized by Google

older trees, that have been marked with this dead line, I nail on strips of boards, nailing into the dead-line anywhere. It is surprising to see how a tree will recover with this treatment. On trees too old to turn, and not yet dead, I hang in brush or any trash. Corn-hills, pulled up and the root-ends hung in the limbs, the tops spread out in front of places of danger, is good; or drive a stub of a post near the tree and nail a board to it. A bushy oak sapling set on the sun side is good—and if any one wishes to raise a choice, tender kind let him set it behind some natural object of protection. It also appears on page 62 that I think late culture helps to produce blight. I never had such an idea in my head. I attribute the cause of blight to the peculiar dead state of the atmosphere at a time when the tree is in its most rapid growth. Manure, high culture, and a warm moisture, all combine to produce the blight—(this is my guess).

I prefer a low-headed tree, near three feet high, but not because I fancy such. I persisted for years in trimming my trees up to five and six feet high, until I was forced to abandon high heads and form them lower. I am well convinced now that there is more in the direction to which a tree leans than in the height of trunk. A tree of one foot trunk, and leaning to the northeast, is in worse condition than one five feet high that leans well to the southwest. One is led to believe by my last article, too, that I approved of the use of tarred paper. This was a fault of my own negligence. When I wrote, last year, I used it, but intended to have added that my faith in its value was not as strong as it had been some two years before. Since then I have taken off all tarred paper, and am now thoroughly convinced that its use has killed quite a number of my best trees, and very seriously injured many more. It often enlarges the trunk to a deformity, and in places where the paper binds against the tree it has killed the bark. I have just washed my trees with a mixture of a half bushel of lime, about five pounds of pulverized clay, one-fourth pound snuff, and two pounds sulphur. What the result will be I can better tell in years to come. I once killed and injured many of my young trees by putting on tar, grease, and tobacco, mixed together.

The idea is general that the *southwest winds* have ever been the cause of our trees inclining with such persistence toward the northeast. *I think* I know this to be one grand mistake. Every tree in my orchard, except from some direct cause well known, leans to the northeast. Now there is no possible chance for the wind to come in on the southwest side, it being thoroughly protected with both hill and thick,

Digitized by Google

tall timber, and the northeast side is the only side open to the prairie winds. We have all read the story of the traveler and his cloak. The wind did its best to divest the traveler of his cloak but effected little or nothing, when the sun took this difficult job in hand and made short and complete work of it.

Let any observing man look about in the old orchards of northern Iowa and Minnesota, and let him approach them from the southeast side, and he can see long before he reaches the first tree that nearly every tree has the heaviest growth on the northeast side. Except from special causes easily shown, not one exception can be found. Such is the case here, and that, too, where the trees are the best protected from the southwest winds. This being true there must be a strong conviction following such important facts; something must be wrong. The first branch that shows signs of decay will almost invariably be found on the south or southwest side. This, killed and removed gives the sun a direct approach and an easy and sure way to work ruin and death throughout the remaining branches. A very fine young orchard was all killed here one winter or spring except one Fameuse and one crab. This Fameuse tree still stands a sound and healthy tree, with trunk leaning toward the one o'clock sun, with the main branches evidently set the same way, with few branches on the opposite side. This is a very important witness, and cannot but strongly impress upon our mind that "*the fittest will survive.*"

Trees after being set with their heaviest limbs on the south and southwest side will in the course of three years show their branches nearly equally balanced, and in as much longer time the same trees, *left to their own way,* will not unfrequently show such change as to show the balance of top passed over to the northeast side. The best orchard we have in this vicinity was set out some fifteen years ago with every tree leaning well to the southwest. This orchard is an exception made so by the way it was set. Scarcely a tree in this orchard leans to the northeast. And but very few trees have failed. This orchard stands *entirely exposed to all the southwest winds.* The above, with hundreds of other observations, have convinced me that it *is the sun,* and neither winds nor excessive freezing, that works the greatest amount of distruction.

If practicable let us quit growing our trees on "indiscriminate" roots. Give us roots from the scion or get the seed for stock roots either in northern Russia or northern Minnesota, where no tender kinds can blossom together and mix to produce tender trees. I cheer-

Digitized by Google

fully accept Mr. Wright's amendment in case we have to use indiscriminate roots at all; let them be as short as two inches, with scions as much as six inches long, and grow them so as to secure the principle part of the roots from the scion. Of new varieties, the Wealthy and Wolf River we consider very valuable additions to our list of iron-clads; the latter I find after fruiting it two years, a very fine, large, and attractive apple, keeping full better than Haas, Plum's Cider, Fameuse, or Talman Sweet, and equal to either in quality and more hardy in tree than either. In setting a young orchard set the first row across the north end of plat, then set the next row so that each tree in the second row will cast its shadow directly upon the tree in the first row already set at one o'clock. I have often seen trees very much benefited by this or a like protection. A tall native tree is not unfrequently found throwing its long kind shadow of protection over some of our half-hardy, choice, apple trees and bringing them through sound and thriving.

The finest grown Mountain ash trees I have ever seen are growing on the north side of a house. They are frequently injured by the sun if grown on the south side of a building. I see no cause to remove the mulch from apple trees except from some tender kinds that may be found growing too fast, late in the season. It may be thought necessary in the southeast part of Iowa, but not in the north and northwest part, except from close about the body late in autumn to keep the tree clear of mice in winter. Late in the season I form a small mound about the trunks of my small trees, and after freezing weather sets in, I mulch all my fruit trees and evergreens. I find that heavy mulching improves the latter very much. I have no axe to grind, am no nursery-man, never sold a fruit tree in my life. Am only turning the stone to cut my own fingers, by helping others to grow fruit to be sold in *competition* with *my own* in the *same market.*

Digitized by Google

PRAIRIE VARIETIES OF THE APPLE.

BY CHAS. DOWNING, NEWBURGH, NEW YORK.

NOTE.—These notes, by the veteran Pomologist of America, were included in a private letter sent to A. B. Crandall, Agricultural Editor of the *New York Tribune*, who forwarded the letter as valuable for Iowa publication.

MR. A. B. CRANDALL—*My Dear Sir*—Some of the varieties of the apple noted in the *Iowa Agricultural College Quarterly*, under the head of "Promising new and not widely known varieties," I have seen and eaten, but do not know them well enough to decide positively as to their true merits. But I will give you a little information which I have gathered from time to time relating to their origin, habits, etc. They are what are called at the west and northwest *Iron-Clads*, and suited to their locality, but very few of them are of much value here where all varieties are hardy. The Walbridge, as stated, is an old variety originated with Joseph Curtis, of Paris, Edgar county, Illinois, and was named Edgar Red Streak after the county, and trees were sold by the sons of Joseph Curtis to Flinn and Reynolds, of Jefferson county, Iowa, about 1848, from whence it was distributed over a portion of Wisconsin, Iowa, etc. But the original name was lost, and being grown considerably by a Mr. Walbridge, it received his name. When the American Pomological Society held their biennial meeting in Chicago, in 1875, B. O. Curtis brought specimens of Edgar Red Streak, which were decided by some of the best western pomologists to be identical with Walbridge. Of course, according to the rules of all pomological societies, Edgar Red Streak should be the true name, and it was so agreed upon at this convention. But some of the Wisconsin nurserymen who had trees to sell got the impression that they would sell better as Walbridge, so they have ignored the correct name.

Utter—Is also an old variety, originating I am informed with Samuel Utter, near Paris, Illinois, and was named Utter in 1840, by the well known pomologist Reuben Ragan, of Putnam county, Indiana. The original tree is six feet in circumference, and about forty feet high; a prolific bearer of fruit of good quality. The Lucy and Winona Chief are said to be synomyous of the Utter.

The Wealthy—Is a very good apple, and is obtaining a good reputation for hardiness, quality, and productiveness.

Sheriff—This was brought from Pennsylvania to Illinois about thirty years since by James Sheriff, without a name, and for some time it was called

Digitized by Google

American Beauty, but as there was another apple of this name, it was renamed Sheriff to prevent confusion. The fruit is of moderate quality, but the tree is hardy, a good bearer, and suited to a cold climate.

Belle Du Havre—This is of uncertain origin. French authors think it probable that it originated in America and was introduced into France about 1805. The tree has the reputation of being hardy, vigorous, and a good bearer, even in a cold climate. It is a pleasant and late summer variety.

McIntosh Red—Is an old variety from Canada, but has not been much disseminated. It is a showy fruit, and the quality is very good. The tree is said to be very hardy, vigorous, and long lived, and is worthy of trial where hardy kinds are needed. I did not intend to write so much when I began, and being a private letter it is wanting in accuracy.

Very respectfully,

CHAS. DOWNING.

TREE AND FRUIT GROWING IN SAC COUNTY.

BY ELLWOOD TATUM, WALL LAKE.

In compliance with your request I will write a short statement of what I know of the condition of horticulture in this county. As I am only a new settler here, and have had the duties commonly devolving upon a person opening a new farm, I have not made a very extended acquaintance.

We are situated on the divide between the Mississippi and the Missouri. The soil in the western half of the county is after the type of the Missouri slope, while the eastern half is pondy and more inclined to gravel. The surface soil is rich and dark (with little or no sand) which gradually merges into a joint clay at about three feet, and in which is found considerable gravel at about six to eight feet from the surface. This gravel occasionally crops out on sharp points.

I think our climate is favorable for fruit here, at least as regards frosts in the spring and fall.

There is a very small supply of native timber in this county, what there is being upon the 'Coon river. Tree planting is receiving considerable attention. The policy of the county was very liberal

Digitized by Google

toward it, as long as it was in the hands of the supervisors, but the work still goes on, as the sweeping winds give the most convincing arguments in favor of planting. Cottonwood seems to be the favorite on account of its rapid growth and the ease of propagation. The soft maple is also planted to a considerable extent. Black walnut and green ash are planted some, especially along roads and lines.

Orchard planting has not received near the attention it deserves. There are, however, a few orchards in the county that were planted some twelve or more years ago, that show that apples can be raised here. I have not visited any of these, nor have I talked with but one of the owners; hence I cannot give much information as to varieties. I met one of the men in the road one day and asked him the size of his orchard. He replied, "About seventy trees." I then asked him what kinds he had. His reply was, "All kinds." (I began to suspect his knowledge.) I then inquired for names. He could only give that of Ben Davis, which he lauded very much. He procured his trees near Des Moines. That is all the information I could obtain from him.

In the spring of 1878 I set out a small orchard consisting of ninety-one trees, as follows: Ben Davis, ten; E. G. Russet, ten; Willow, five; Jonathan, five; Walbridge, three; Iowa Blush, two; Grimes' Golden, five; Fameuse, ten; Wealthy, two; Gros Pomier, five; St. Lawrence, five; Early Pennock, two; Tetofsky, five; Duchess, five; Red Astrachan, five; crabs, twelve. These trees are all doing well but one, and that was killed by a pocket gopher. I took for my guide mainly the Horticultural Report of 1876, but I find I have too large a proportion of summer and fall apples.

One of the greatest hindrances to fruit culture here is the lack of fences. The herd law is in force here during the summer and fall, but in the winter and spring, by common consent, cattle and horses are permitted to run at large, and as fencing costs money the orchards have to suffer. My orchard is the only one that has any pretense of a fence for miles around, and last winter it had but one barbed wire on little posts no thicker than my arm, and they were two rods apart. This winter I have added another wire. The cattle went through occasionally last winter, but did no harm to speak of. A near neighbor has an orchard of 106 trees, every one of which started, which last winter was almost entirely destroyed by stock, mostly his own. There is scarcely a tree in it that has not been mutilated, and many were broken off near the ground.

We also have the fruit-tree agents to contend with. I think the

Digitized by Google

worst specimens of that kind were a couple of fellows from Dayton, Ohio. They came to me nicely dressed, with lots of jewelry, fancy team, etc., and presented their card. I informed them that I was always ready to talk to an intelligent horticulturist, but as for giving an order to a nursery outside of the State, especially in that direction, I should do no such thing. They tried to argue the case, saying that that they wished to introduce their stock, and that they would give extra inducements, and that Dayton was second only to Rochester, N. Y., for raising nursery stock, etc. During the argument they chanced to remark that there were only six standard varieties that they would recommend for this latitude. I asked them what those six kinds were. They evaded, but I persisted. They finally gave the name Tetofsky, and I could get no more. I understand that they sold ordinary trees at from thirty to fifty cents apiece, warranting them to bear in two years, stating that they were from five to seven years old. They sold a great many trees through here, mostly to foreigners.

There have been a number of others through here, some of whom seemed to do a square business, while others seemed a little tricky.

I think our trees went into winter quarters in good condition, but the cold dry weather we are having may be too much for them. Small fruit and gardening is sadly neglected around here.

Before closing I would like to request that you prepare a list of say one hundred trees, or trees sufficient to plant one acre, giving the name and number of each kind that you would advise, or perhaps leave five or ten blanks to be filled by the agent or nurseryman who sells the trees, for he will be sure to offer some changes or wish to push some favorite or hobby, and this arrangement would give him a little room without interfering with the arrangement. Such a list would be of great benefit to many a one situated as I was two years ago.

I wish you success in the good work you are doing.

Digitized by Google

NOTES ON PEAR GROWING.

KNOXVILLE, IOWA, Dec. 28, 1879.

MY DEAR SIR—Four years ago next spring I imported from France one tree each of about twenty varieties of the pear. About twelve of them were of the newer varieties. Up to this time I have watched them closely, and I will take advantage of this leisure moment to give you some notes as to the behavior of these and some other varieties on my grounds.

I will say in advance that I have settled in my mind a few points in regard to pear culture. For instance, some varieties utterly fail to endure our climate. Again, other varieties, whose death is attributed to *blight*, are simply killed by our severe winters. Still other varieties retain a feeble growth and vitality for two or three years in the outer bark, while within the wood is discolored and blackened. The strictly hardy varieties in our section we do not find thus discolored in wood, except on immature terminal branches. To prevent this form of injury from ultimately spoiling the tree this immature growth should be watched carefully and cut off in the fall before severe freezing. If this is done with care I think very little blight will be found. I will also note that many trees of hardy varieties, from four to seven years old, are killed for want of hardy roots. With me this applies mainly to dwarfs, as I raise no other kind. No quince root I have tried is hardy except the Angers. Before I discovered this important fact I lost hundreds of trees by the killing out of the quince roots under them. I have obtained from some American nurseries stocks for the Angers variety which were not true to name. Pears on these spurious stocks failed when from four to six years old. On the true Angers stock I have trees which are from fifteen to twenty years old.

The varieties I have propagated on the Angers roots are as follows, and with the results named:

Doyenne du Comice—This is uncertain yet as to hardiness.

Buffum—Tolerably hardy. With careful fall pruning of immatured wood will do very well. I have one tree on Mountain ash root which is sixteen or seventeen years old, and in apparent good health; but on this root it does not fruit as well as on the Angers.

Digitized by Google

Doyenne Boussock—One of the hardiest and best I have. A tree I obtained of Andre Leroy twenty-two years ago has scarcely ever missed a crop; but it was injured below the surface of the soil on one side by the terribly dry and severe winter of 1872-3, and is nearly dead from that cause. Yet it bore a few specimens last year. It was three years old when I obtained it, and is now twenty-five from the bud. Prof. Bessey aided me in examining its root seven or eight years ago. Dr. Hull had stated positively that the pear would not live over from four to seven years on the quince root unless it threw out roots from the pear wood above the quince stock. To disprove this statement, as applicable to the Angers stock, I asked Prof. Bessey to aid in examining this tree. We *then* found, as I find to this day, that the only trace of a root the tree possessed emanated from the quince stock.

Tyson—Quite hardy, and fruits well, but is tardy in coming into bearing.

Burkitt—A seedling from Illinois. It appears to make very mature growth, and it stood last winter in perfect order. I think it will fruit with me next year.

Flemish Beauty—One of the hardiest; the quality is well known. Does best on soils of moderate fertility.

Souvenir du Congres—A new, much lauded sort, of vigorous habit of growth, but with me a failure, as it fails to stand our winters.

Brockworth Park—Promises well. Stood the last winter without the least apparent injury to new growth.

Uvedale's St. Germain—Very hardy, and a fine grower.

Winter Nellis—Quite hardy.

Beurre Piquery—Hardy, and a good grower, but tardy in fruiting, even on quince root. A very fine fruit.

Beurre Clairgeau—Tolerably hardy, and fruits early. Fruit large, handsome, and excellent.

Belle des Abres—Growth in past years considerably browned. Do not consider it hardy.

Bonchretien Provost—Tender; winter-kills badly, and what is left blights.

Mt. Vernon—Promises well for hardiness; tree crooked, but healthy.

Beurre Baltet Pere—A good grower, and appears to be quite hardy.

Duchesse de Angouleme—I cannot, after many years trial, recommend it for this soil and climate.

Louise Bonne de Jersey—Of this I have a tree on the Angers that is twenty years old. It is a great bearer.

Digitized by Google

Clapp's Favorite—Promises well.

President Conprie—A new French variety which, on three years trial, promises to be very hardy. A slow grower.

White Doyenne—Tolerably hardy, and a great bearer.

Seckel—Quite hardy, and a good grower. To succeed on the quince it must be double-worked.

Wilkinson—A new variety from Illinois, with high recommendation for hardiness and heavy fruiting after long trial. I have only two year old growth of it on Angers stock, which endured the past winter perfectly.

We have had the poorest pear crop I have known since I have been here. I am hoping for better results another year. Apples ripened prematurely. We can hardly say we had any winter apples.

Very truly yours,

JAMES MATHEWS.

REPORT FROM MUSCATINE COUNTY.

J. L. BUDD—*My Dear Sir*—In reply to your notes of inquiry I will say, the Barnard Improved blackberry is a seedling from the wild blackberries of Belmont county, Ohio. The fruiting of the variety with me may be gathered from the following note from the *Muscatine Journal* of August 8, 1876:

"SUCCESSFUL FRUIT-FARMING.—Monday we rode out to Mr. Barnards and feasted our eyes and palate on the luscious blackberries growing so profusely in his 'patch.' It is really astonishing to see the luxurious growth of this health-giving fruit, as it is to be seen there. We had supposed the blackberry was difficult to raise in this latitude —that our winters were too cold and our summers too dry, but the abundance and fine quality of this fruit now coming to market shows that this was a mistake. Mr. Barnard is cultivating a variety which he calls 'Barnard's Improved,' and there is none superior for flavor, for abundant yield and hardy growth. The vines commence bearing fruit in their second year, but the most prolific in Mr. Barnard's patch are now four years old. He does not cover them in any manner

Digitized by Google

to protect them in winter. His crop this year will be between twenty-five and thirty bushels on an eighth of an acre of ground."

This local item gives the actual sale of that year from one-eighth of an acre. The crop sold was 26 bushels and 3 quarts, and the cash receipt was $125.39. I suppose we used for canning, on table, and in the patch, fully 65 quarts. There were 27 cherry trees on the same ground, from which I sold 25 bushels of fruit.

In June, 1877, we had a hail-storm that destroyed everything. The bushes were then full of fruit.

In 1878 the canes were so injured by hail that I only got 968 quarts from three-fourths of an acre.

The winter of '78 and '79 was so severe that the canes were much injured, though they lived and bloomed and gave some fruit, but my young patch did better, giving 393 quarts, though girdled badly by mice.

From this you will note that my blackberry patch has fruited quite regularly the past unfavorable years.

My Lawton and Kittatinny canes were killed to the ground and gave me no fruit last year.

The fruit of the Barnard is about the size of the Kittatinny, and is far more melting in fruit than is usual with this fruit.

RASPBERRIES.

I have tried a goodly number of varieties, but I have only retained for profit the Improved Doolittle. This I have fruited for fourteen years, and I find it hardy, and it has fruited every season except that of the great hail-storm. My crop in 1876 from three acres was sold for $337.91. In 1877 the hail-storm picked the crop in fifteen minutes. In 1878 the canes were so weakened by the hail-storm that they only gave me 1,515 quarts, which sold for $106.99. In 1879 the same patch gave me 3,500 quarts, that sold for $250.00. On the same ground I have an orchard of apple and cherry trees.

STRAWBERRIES.

The Wilson has been *my* best variety. My neighbor, Mr. Marsdale, thinks the Jucunda is the most profitable variety; yet another neighbor, Mr. Shoemaker, thinks the Green Prolific is, with him, the most profit-

Digitized by Google

able. Still another, Mr. Bagnard, is in market with a seedling he has produced from Wilson fertilized by Hovey seedling, which he call Improved Wilson. I shall set this variety in my grounds this year. I have fruited this year Wilson, Ohio Mammoth, Green Prolific, Seth Boyden, Kentucky, Jucunda, Cumberland Triumph, Crescent Seedling Capt. Jack, and Large Early Scarlet.

The Ohio Mammoth originated with Mr. Burr, of Columbus, Ohio. I esteem it as one of the best in quality, but it is a shy bearer, yet every year it gives a fair crop. The largest berries are five and one-half inches round. Fruit light pink color, flesh white, very sweet and melting, but less juicy than some sorts. I have grown this variety thirty years.

I only commenced last season to test some of the newer sorts, and I am not prepared to report for or against them.

The largest crop of strawberries I have grown was in 1868. On a patch of three acres, one-half Wilson and balance Ohio Mammoth and Early Scarlet, I grew on an average 3,000 quarts to the acre. The last named kind I do not think has ever been excelled for quality. They now talk much about large strawberries. I cannot see very rapid improvement. Thirty years ago, at Zanesville, Ohio, I exhibited Hovey Seedling and Ohio Mammoth as large as anything I see in these days.

Of cherries, I only grow Early Richmond, Silver Thorn, and Black Morello, all of which are good, and give me good crops.

I have quit planting pears.

The apple I gave you has been sold by Mr. Foster as Barnard's Favorite. When I bought my farm here the orchard contained 72 seedlings. This tree was the largest in the orchard. Five years ago I picked 27 bushels. The old tree is now about dead. My young trees look well. I have kept the fruit until the fourth of July, but it is good in midwinter.

Digitized by Google

REPORT ON LAYING OUT, FENCING, AND PLANTING OF FARMS AND YARDS.

GEO. W. OBERHOLTZER, SIOUX CITY.

In the northwestern part of Iowa, necessarily but little attention has been paid to the ornamentation of our farms. Its substantial growth dates back but seven or eight years, and as the most of our settlers were poor when they homesteaded their lands, they have been fully occupied in breaking and improving their farms and providing the necessities of life for their families. The planting of trees for timber and windbreaks, however, has received much attention. Our native trees, the cottonwood, box elder, elm, ash, maple, basswood, hackberry, and walnut, from the woods which skirt the streams in this and adjoining counties, all thrive well when transplanted upon well prepared ground on our prairie farms. They should be cultivated as carefully as corn, when young.

We cannot look for success with finer plants until the soil is thoroughly subdued and cultivated, and the windbreaks established so as to give shelter from severe winds and storms.

Let me draw a picture of an ideal farm and a plan for its planting. Let us place it upon a highway running past it on the west. For social reasons, farm houses and farm buildings should always be built near the road. There is a great deal of social comfort, especially for the farmer's wife, in watching, in moments of leisure, teams and carriages as they pass along the highway. The buildings should not be placed too near the road; at least five or six rods of lawn space should be left between the road and the front porch. Place your house as near the north side of your building spot as may be convenient so as to give the lawn as much of a protected south exposure as possible. On the road line should be planted a row of shade trees, or if the space is ample, two rows; the trees in the inner row to be set so as to divide the space between the trees in the outer row. For best effect when grown, these trees should be at least twenty-five feet apart, and kept

Digitized by Google

well trimmed up so as to give a full view of the house from the roadside.

On the lawn the turf should be the main feature. In all ordinary locations, Kentucky blue grass, if sown thickly on well prepared ground in the rainy season, will in a few years make an admirable lawn. The secret of a good lawn is keeping it well cut with scythe or lawn mower. A top-dressing of well rotted manure applied in the fall is excellent. There should not be more paths laid out than are necessary to reach the doors of the house. Plant trees sparingly upon the lawn; let those planted be of as many kinds as possible, for the sake of variety, by the contrast of form and foliage, both when in full leaf and in autumn colors. Do not plant trees close together upon the lawn; they grow so much more beautiful when isolated. Large trees should not be planted closer than fifty feet apart on a lawn. Plant no large trees near the house, except one or two to shade the west windows of the upper chambers from the extreme heat of our midsummer suns. Low growing shrubs and trees are especially adapted for the lawn. Try first the wauhoo, the thorn tree, the basswood, the aspen, the coffee bean, the ironwood, the buffalo berry, and the mulberry, from the woods of the Missouri river and its tributaries. Add from the nursery the hardy catalpa, mountain ash, silver-leaved poplar, the Juneberry, and even the crab apple—so beautiful in bloom and fruit. Of the hardy shrubs, the flowering almond, Missouri currant, spirea, lilac, and tree honeysuckle, are all beautiful, and if care be taken when young will become perfectly hardy.

The attempts to plant evergreens upon our lawns have in nearly every instance been failures. For this locality, I can recommend none but our native red cedar of our bluffsides and ravines, which, when transplanted into the yards, grows rapidly, and if neatly trimmed is very ornamental. A group of cedars, mingled with a few Scotch pines, should be planted upon the northeast corner of the lawn; while a few, neatly trimmed, might be interspersed with other trees to give winter relief. The Scotch pine is the only one of the nursery evergreens which shows any signs of thrift, and it only when planted in groups or sheltered positions.

By all means add porches to the house, if they are ever so humble, and put here and there a simple lattice, over which the hardy American ivy, woodbine, climbing roses, wisteria, and yellow and scarlet honeysuckle should be trained. Nothing else that one can plant makes home so homelike.

Digitized by Google

Trees and shrubs on the lawn should not be planted in regular systematic order, much less ranged along the paths, but grouped here and there, so as to leave open spaces for turf at intervals. Trees when young, and shrubs always, should have a space three or four feet in diameter, kept free from grass for cultivation in summer and mulching in winter. A very pretty effect is produced by planting crocus, tulips, verbenas or any low-growing flowers in these spaces. All shrubs when young should be heavily mulched with leaves or litter on the approach of winter, and well protected with hay or corn fodder, bound around the stems. Even those that are hardy thrive better the following summer with this treatment. Neglect of this simple suggestion is the most frequent cause of failure with small shrubs. Of course there should be beds for roses, annuals and perennials upon the lawn, dug deeply and well enriched. I would not have them raised above the surface of the turf, however. Our summers are too dry for that, but simply cut out of the grass, where they can get the sunshine or shade best needed for their growth. Do not forget in some shady nook, a bed of pansies. Make the back porch, where the housewife must so often be, cheerful, by trailing over string or lattice, morning-glories, honeysuckle or the wild cucumber.

The wind-break of forest trees should be planted to the north and northwest of the house, taking the form of a letter L. Let the widest portion of this be extended back at least eight or ten rods from the road. In this L of forest trees let the barns and sheds be built, open to the south and east. In planting the wind-break, put the white willow, box elder, and other of the hardiest low growing trees in the outer tiers. In the space east of the house and south of the barn, will be a sheltered spot where grapes and small fruits would thrive, and the kitchen garden might be put. While off to the south and east could be planted the orchard, which, differing from the lawn, should be planted in regular systematic rows.

FENCES.

While our herd laws may be valuable for temporary expedients, to protect the crops of the poor farmers, it seems to me that in this, which is pre-eminently a stock region, all must, sooner or later, fence. Fencing may be costly, but without it the farmer can have no peace either day or night, week day or Sabbath. The practical effect of the herd law is to drive cattle out of the country, thus taking from the farmer one of his most profitable sources of income. At least this

Digitized by Google

has been the effect in the region around Sioux City. What shall we do then? It seems to me that the solution of the fence problem lies in the live fence.

Of the hedging plants, the buckthorn proves perfectly hardy here as well as in Minnesota. Though slow of growth, I think in time it will make an excellent hedge. The white willow is a very rampant grower, and with the aid of a wire here and there makes a good fence. Some of our farmers on the Missouri river bottom have made an admirable fence of the box elder.

The coming fence for this region, is however, I think, that so strongly recommended by C. E. Whiting, of Monona county, in several of his reports, made of panel and wire fence on lines of living posts. Not only can the standing trees in these shelter belts be used as posts, but they add greatly to the beauty of our prairies. The needed thinning furnishes the farmer with his timber, and the shelter given by these belts of timber greatly increases the productive value of the land enclosed.

CURB LINE TREES.

In our towns in this section, the streets are being rapidly lined with beautiful shade trees. The maple, white elm, ash, and box elder are the favorites. The maple, carefully trimmed, is for the purpose, I think the handsomest of all these trees. Its drawback is that it will not stand our high winds. As the towns build up, however, this will in a great measure be prevented by the mutual protection they give to each other. The exclusive planting of any one kind is not to be desired. The basswood or linden considered in eastern cities the finest curb line tree, might be added as well as the hackberry and coffee bean. The great error is in planting trees too thick. The curb line trees are placed sixteen feet apart, and often a second row is put on the lot line twelve feet aside. The trees thus grow upright and bald, and force each other out of shape. Some beautiful specimens of ash and maple, that we have on one of our streets, fifteen years planted, and standing at least thirty feet apart, convince me that we would give a much better effect to our streets if we would plant half as many trees.

CITY FENCES.

However practical it might be in suburban towns, given up entirely to the better class of residences to do away with fences, I am satisfied, in our business towns, that without fences you can have no orna-

Digitized by Google

mental lawns or grounds. Ordinances may be passed restraining cattle from running on the streets, but the vote that lies behind the poor man's cow, is generally strong enough to prevent their enforcement. Bossy will not be deprived of her streetside clippings. At present we must fence our city yards, but let these fences be made as light, airy and graceful as possible.

PLANTING CITY YARDS.

The most serious drawback to the planting of our yards and lawns has been the voracious appetite of the migratory grasshopper. They are dainty feeders, and to them, the foliage of our choicest plants seems most attractive. Against them we seem to be helpless, and can only hope that in the future, we will be so far in the interior, that they in their southward flight will not reach us.

What I have already written concerning the planting of farm lawns is equally applicable to our city yards. The general rule is to lay out lots fifty by one hundred and fifty feet. It seems to me that for the best effect the houses should not be placed nearer than thirty feet to the front line. Keep the space in front of the house in an open, neat lawn. Let the threshold of the house stand at least three feet above the sidewalk, with a gradual slope from the gate to the porch. Who can give us a grass that will grow upon our steep terraces and hillsides, on the bluffs of our Missouri river cities? It is too dry for blue grass as many have discovered to their cost the last dry season.

All of the shrubs and trees that I have previously mentioned, except the catalpa, are growing thriftily in our city yards, and in addition to them we have beautiful beds of the hybrid perpetual, scotch and moss roses. In shrubs, prunus triloba, beautiful and very hardy, berberry, forsythia, syringa or mock orange, weigelia rosea, pyrus japonica and snowball, will do well, but should have winter protection. We have also some beautiful specimens of climbing roses, scarlet honeysuckle, clematis and wistaria.

In the planting of farms and yards, so much depends upon locality and individual taste that we cannot lay down other than general rules.

The most that we can do is to give the record of the success and failures of those who have overcome many difficulties, and earnestly sought to solve the problem—how can we so surround our prairie homes, with beautiful trees and flowers, so as to make them *real homes?*

Digitized by Google

FRUIT IN RELATION TO HEALTH.

BY WM. R. SMITH, M. D., SIOUX CITY.

Mr. President and members State Horticultural Society—Nothing has had so powerful an influence in humanizing mankind, and in improving his sanitary condition as becoming accustomed to a bloodless food derived from the vegetable kingdom.

Instead of a deadly struggle for existence, the vegetable world freely yields up its best gifts without being essentially impoverished thereby. The kernel, the ripe fruit, the farinaceous tuber, derived from the vegetable world, depends upon no strife with nature for its attainment, except in the sense that all life is somewhat a strife for bread. The fruits of the earth are yielded up peacefully, and hence man himself inclines to become peaceable, which fact powerfully contributes to his physical, mental, and moral health, to say nothing of the immense advantage as to economy of food, which a fixed agricultural population possesses over those nomadic, wandering tribes of savages and hunters who still wander over a large portion of both continents, depending for food on the chase, or upon the accidental produce of the soil.

In regard to the use of fruit in relation to health, it becomes necessary to inquire first something concerning the use of food; and adopting the language of Dr. George Bayles, we may say, "A large proportion of the substances of our food is merely contributive to its mass or bulk, and therefore becomes, in process of digestion, separated from the strictly nutritious parts, and is cast out.

"The absorption of the retained, or nutritious parts, by which the body is sustained and enlarged by natural growth, is a process termed assimilation.

"It is simply the beneficial parts of ingested food. Articles of food differ very much in the amounts of their contained assimilable, or nutritive properties. Tables of relative assimilability have been compiled for the use of students of medicine, and for all inquirers into the subject of digestion of food. Such tables have only a relative and suggestive value, because, at least, they can only generalize in a very imperfect way. We differ in our ability to make exactly the same sat-

Digitized by Google

isfactory or appropriate use of some articles of food, as we find our neighbors may be able to do. It then becomes necessary to study our individual needs and capacities, so that in the use of food we may be a law unto ourselves.

"And we may do this by carefully remembering our impressions and experiences relating to articles of food, of which we partake, in their various combinations and modes of preparation, as relating also to time, place and season.

"Our studies of digestion must be personal, to be applicable and true. We are, therefore, reminded how little the time tables of digestion serve those who wish to know what food can do for them, and what they can do with food.

"Man is an omnivorous animal, as he includes all food products in his list.

"Appetite for food is simply the expression of the nervous system of the need of the body of material supplies, which, in health, is attended by sensations of satisfaction and pleasure."

We may infer from the above how little people, in their usual health, should be influenced by the dogmatic statements, as contained in some of our standard dietetic tables, in reference to the relative digestibility of different articles of food; and in deducing therefrom just what we should eat, more especially when they seem to establish the inference that all kinds of fruit fail to be suitable for food, because of difficult digestion.

It is a well attested physiological fact, that a taste and tolerance of many kinds of food, may be, and is largely acquired through custom, and by opportunity, necessity and habit; and that this education of taste and appetite, beyond the limits of that which is common, may be made of inestimable value and importance in a hygienic sense, and notably in regard to the judicious use of fruit for food, or its incorporation in our usual diet.

Rev. Henry Ward Beecher says, in an article contained in the *Christian Union*, and headed "fruits for food": "There is no sense in the old familiar motto: 'Fruit is gold in the morning, silver at noon, and lead at night.' Because, with a limited experience, people perceive that some folks can eat fruit at one time and not another, they lay down this rule as a principle for all. Take a family of children, teach them to eat fruit at morning, noon or night; their constitution conforms to it just as it does to tobacco or small doses of arsenic. (Which, by-the-by, is not a happy comparison.) And that the cases where fruit is

Digitized by Google

unhealthy at night, are the exception. It is true, that in tropical climates heavy fruits, difficult to digest, ought not be taken at night. Eating bananas, in Cuba, at night, is considered next to suicide for a man who is unacclimatized. I should never eat one here in the North unless I had a strong digestion. It lies heavy. But the fruits that are on our northern farms are all healthy, as a rule. Amongst the excellent small fruit are currants, gooseberries, raspberries, strawberries, grapes, mulberries; these last are a very much neglected fruit; there is no better fruit tree for children than Downing's Everbearing mulberry. One of them will bear fruit eight or ten weeks steadily, constantly ripening and pleasing all the fowls and turkeys, and children and old folks. I would rather have this mulberry to-day than a strawberry. The common mulberry is flat and sweet, but this has a fine, sprightly acid taste, as finely combined as lemonade.

"As you go up, you have the apple, which is the patriarch, or the Abraham, of all fruits. If I had to choose but one fruit out of all the world, I should decide for the apple. For uses of every kind, early and late, winter or summer, cooked or raw, apple is king. Then comes the cherry, then the pear, then the plum, and then the peach. I have not mentioned oranges, because they are not raisable in the north, but they ought to be eaten at the right time, which is all the time from getting up in the morning till you go to bed at night. The man with whom they disagree is the exception."

I may remark here that the physiological function of assimilation and nutrition, to repair the waste and needs of the body, is not the only office of the use of ingesta, or food. A celebrated old Scotch physician laid it down as an axiom of health "that we should keep the fear of the Lord before our eyes, and our bowels open." The first, no doubt, was his idea to guard erring mortals against venal social excesses; and the second to regulate our systems by exercise and proper articles of diet.

Now of all the means known to promote and preserve a soluble and laxative condition of the bowels, compatible with a perfect healthy action of the same, none exceed the judicious use of fruit.

There is, as has been seen, a different estimate as to the value of the ordinary fruits grown and used in the more temperate latitudes. We have heard Mr. Beecher's opinion concerning the apple, which probably tallys with the general estimate, both in relation to its culinary uses and sanitary properties. Roast apples appearing even in the list of articles as a proper aliment in our orthodox dietetic tables.

Digitized by Google

The pear, as a domestic fruit, is considered by very many as ranking second to the apple. The apple is more highly esteemed for cooking, but for the dessert the pear is generally held as much superior—this is pre-eminently so in European countries. And Pereira, the great English author of Materia Medica, regards it as much easier of digestion.

The same eminent authority also says that "the physiological effect of the highly palatable flesh of the peach is nutritious on account of its sugar, gum, etc., and refrigerant (or cooling) from the malic acid it contains, and wholesome when eaten with moderation, but otherwise is apt to disorder the bowels." Fresh ripe plums are particularly wholesome, and moderately nutritive. And the medical prune is much valued as a mild laxative. The immature fruit of the plum, and for that matter I might say of all fruits, should be religiously avoided. It is in witnessing the deleterious effects of the use of immature, and overripe fruits which have become sour by fermentation, that makes cautious, observant medical men very chary in giving their indorsement to the use of fruit at all.

Mr. Clubb, of Michigan, in speaking of the cherry, says very enthusiastically, and I think very correctly, that it is a universal blessing. And he further says that "in every position of life the cherry contributes in some way to the comfort, enjoyment, and service of man. It forms the most showy fruit in the market, only equalled by the precious strawberry. It makes the best canned fruit, and as a dried fruit has no equal in the realm of commerce. Its curative properties are universally conceded. It gives pleasure to youth, comforts the aged; whilst its rich color is the acknowledged standard of beauty on the lips of the most charming of womankind."

This latter property of rich color, which Mr. C. mentions, we can fancy would be a very enjoyable aliment to, at least, all the male devotees of horticultural products, if they could get the privilege of plucking the fruit; and no doubt, too, would be regarded by them as highly sanitary. The taste of good luscious fruit being always pleasant, and is said to produce a sense of enjoyment, very near akin to a feeling of high health.

The author of that meaty little book "Ten acres enough," remarks concerning the strawberry, "that it is the prime favorite of the season —of a delicious flavor, with just sufficient of tartness to render it agreeable; it commends itself to the taste of young and old, while its cooling property renders it highly beneficial in a hygienic point of

Digitized by Google

view during the early heats of dog days, while its cheapness places it within the reach of all."

Rev. E. P. Roe, in writing about strawberries, says: "To people who live in the country, small fruits are like heaven, objects of universal desire and very general neglect. As the warm weather approaches people tire of meats, and many not professed vegetarians long for some substitute for the heavy winter diet. Yet from how many country breakfast tables continue to rise the pungent odor of that meat which the devils went into, and out of which there is no proof they ever came, when with but little care and expense, the most tempting and nourishing fruits might be gathered from the garden under the window. And further, that the heart and the stomach have been found nearer together by the metaphysicians, than by the physiologists, and if the 'house mother,' as the Germans say, beamed often at her children over a great dish of berries, flanked by a pitcher of unskimmed milk, not only good blood and good feeling would be developed, but something that the poets call 'early ties,'" and as he would have us understand, increased attractions of farm life, which would be equally desirable and salutary.

In reference to grapes, that fruit which followed the footsteps of man from the shores of the Caspian sea and "intertwined its tendrils with civilization and refinement in every age," all medical men agree in the opinion that fresh grapes are wholesome, nutritious, and refrigerant, and medicinally are diuretic and laxative and the judgment of the rest of mankind agree in regard to the purity and deliciousness of its flavor. In reference to its expressed juice, some one asks why should man be deprived of the real essence of life, wine? and says wine is a pure beverage which nature furnishes, and should be attainable by every one; and that it has a beneficial influence on the nature and character of the individual, and is capable of exalting the condition of a whole people by making them social, contented, brave and happy, and pleads for the universal culture of the grape in this country, as has been done for centuries in other lands. But while, as a general thing, the habit of taking wine is one of luxury and not of health, and hygienically considered is to be mainly avoided, yet medical men are understood to be agreed, in regarding the best quality of it, in some states of the system, as a cordial, stimulant and tonic, and at times absolutely indispensable in the treatment of the sick.

I saw, only a few days since, a statement by a distinguished authority, that the soldiers of Cyprus have been kept entirely free from

Digitized by Google

scurvy solely through the abundance of grapes and other fruits which abound in the island.

Institutions known as "grape cures" abound in Europe, or especially on the continent, and are famous as resorts for invalids, having a reputation of great success in the treatment and cure of many chronic diseases. As a further illustration of the popular appreciation of fruit in Europe, my attention has been called to the fact, by Mr. G. D. Perry, of Michigan, that at a recent Vegetarian Conference, in England, 200 guests partook of a "bill of fare" consisting of stewed damsons, stewed Normandy pippins, stewed peaches, grapes, "digestive bread," butter, tea, coffee, and milk. Some of you, too, may have noticed a recent statement of Mr. Gladstone, to the effect that the English people import $25,000,000 yearly of fruits from abroad. A most remarkable tribute to the value of fruit by our "beef-eating" cousins. I will remark here, that it has been noticed since the introduction and great consumption of canned fruits and vegetables, that scurvy, which in past time was such a scourge among soldiers stationed at frontier posts, and crews of vessels on long voyages, is greatly disappearing.

In scurvy the blood is starved of some essential ingredient which fresh and canned fruit and succulent vegetables supply and renew. If we are adjured to call down blessings on the man who invented sleep, ought it not be extended to the man who invented canned fruit and vegetables? Fruit, as before hinted, is medicine, as well as food, and has the further recommendation, in conforming to the universal aspiration of the doctors, in pandering to the increased sensibility, or growing effeminacy, I do not know which, in endeavoring to make their medicines particularly palatable. And right here, though perhaps it may not be considered as germane to our subject, though it has been hinted at in what I have already said, I am tempted to introduce something concerning what has been called "moral dietetics."

Dr. Bock, of Leipsic, writing on the moral effect of food and drink, says: "The nervousness and peevishness of our times are chiefly attributable to tea and coffee. The digestive organs of confirmed coffee drinkers are in a state of chronic derangement, which reacts on the brain, producing fretful and lachrymose moods. Fine ladies addicted to strong coffee, have a characteristic temper, which I might describe as a mania for acting the persecuted saint. Chocolate is neutral in its effects, and really the most harmless of our fashionable drinks. The petulant humor of the Chinese can be ascribed to their immoderate

Digitized by Google

fondness for tea. Beer is stupifying, wine impassions, whisky infuriates, and eventually unmans.

"Alcoholic drinks, combined with a flesh and fat diet, totally subjugate the moral man, unless their influence be counteracted by violent exercise. But with sedentary habits they produce those unhappy flesh sponges which may be studied in metropolitan bachelor halls, but better yet in wealthy convents. The soul that may still linger in a fat Austrian abbot is functional to his body only as salt is to pork, in preventing imminent putrefaction." While we may be naturally curious to know what kind of fluids the doctor does recommend to satisfy the demands of the human system, and to preserve its moral purity, especially as it is well known that water is not a favorite drink in Germany, yet his statements suggest beyond the power of successful contradiction that our physical, mental, and moral states depend very much upon the nature and character of the aliment selected to meet the complex demands of the human system. It is evident that in order to make progress toward a condition of high moral and physical development, vegetable nutriment, including fruits as an aliment, have a remarkable influence in the attainment of this object, and that, everything else being equal, a subsidence from a high standard of physical, mental, and moral health will be noticeable in proportion to our unwise selection of what we eat or drink.

We must not only avoid whisky, but be careful and mix our animal diet largely with that nutriment derived from fruits and vegetables, which grow with such wonderful adaptation and fitness for the use of man. As a universal rule in health, that is best to be eaten which the natural unperverted appetite craves.

And persons are rarely found, and especially young persons, who do not relish fruit. The main source of mischief arising from this fondness of fruit would be likely to come from eating immature or overripe fruit. Mischief may also arise from eating good fruit in excessive quantities or at imprudent times.

Most of us, in eating fruit, follow the example of the old gentleman who was immoderately fond of mush and milk, and always ate of it until it gave him what he called a pleasant pain.

General experience indicates it should not be eaten too late in the evening, though to this rule there are many exceptions. Of course, our experience and the timely application of rules of common sense must guide us in this matter. No solid food of any sort or kind

Digitized by Google

should be eaten in unfavorable conditions of the body, when suffering from a chill, or greatly depressed from any cause whatever.

It has been said, in substance, concerning fruits, that even if there were no other mode of determining the locality of Paradise, the point of radiation of all European civilization, our knowledge of the choicest and most nutritious fruits and plants would enable us to establish its position. Fruits, too, have the power of neutralizing lithic acid, and thus assist in preventing rheumatism, gout, and gravel. Grapes, currants, and other ripe subacid fruits are very useful in this way. Then jellies, of almost endless varieties, the product of fruit, are found very grateful in states of convalescence.

While I do not altogether approve of what is said to be the European plan, of living wholly to eat, yet I think it is infinitely better than the hurry scurry of the Americans' plan, who seem to eat only to live. This eating in such a hurry is a most pernicious habit, and multitudes thereby bring upon themselves the tortures of dyspepsia.

Europeans know how to enjoy a dessert of fruit after their principal meal; and, what is more, they always have it when within their means.

A dessert of fruit is a thousand fold better than the usual pastry abominations; and all American families should seek to have it, so they may live long in the land which the Lord hath given them. Fruit, happiness, and longevity go together; on the principle that a rational enjoyment of comforts make us happy. And the doctors, you know, tell us that happiness and contentment are favorable to longevity. More rational deliberation and definite perceptions of the varied and complex actions of the animal economy, as to the nature and operation of food, must necessarily lead to good results in the conservation of health and happiness, and to the perfection of the physical and intellectual condition of our people.

It is a matter of vital importance that this fruit problem in relation to health, should be carefully studied. To be sure, the common instinct of man is, to a great extent, a reliable interpreter of nature; and the natural language of the stomach generally reveals to us what the system most requires; and we have already noticed this almost universal relish for fruit.

But careful observations and experiment by those professing unusual facilities should be constantly in order. Enough is already known to establish the sanitary effects of fruit when incorporated in our regular system of diet, in the manifold forms of culinary preparations, or

Digitized by Google

eaten as a dessert. Still it is believed by a large and increasing constituency, that its value as a hygienic agent, is imperfectly understood, and very generally underrated.

I think investigation will show its great contributive value, in adding bulk to our food, and increasing its laxative effect, besides furnishing those ingredients in the form of finely combined acids, indispensable to a condition of high health. Physiologists tell us that an aliment abounding in nutritive matter may be much inferior as food to one which contains a much smaller proportion, if the latter is reliable, and is calculated to facilitate digestion and promote a proper action of the bowels, through increased secretion. Many physicians place a great value on the judicious use of ripe fruit for the cure of dyspepsia, and still greater importance of its use, in avoiding the ills of indigestion.

Of course no arbitrary rules can be laid down in reference to its use. Much must be left to individual experience.

One thing, however, is pretty certain, that in our ordinary health a judicious use of cooked, or ripe fruit, whenever attainable, will never be amiss.

I am aware that this hastily written paper on the subject assigned me, only touches upon the topic under consideration. It may, however, be the means of suggesting its importance to some one capable of writing exhaustively, upon a theme so vital.

In conclusion, I hope the time may soon come when, through the influence of horticultural societies, literature and labor, every person in the land may be furnished with the yearly circle of fruits—strawberries, raspberries, currants, cherries, peaches, and grapes; with summer, autumn, and winter apples and pears, to say nothing of the more tropical orange, which golden fruit we are informed, Hercules stole from the garden of Hesperides, where it was only cultivated for the table of the gods; a fruit which so exquisitely delights our palates, and equals the aroma of the spicy breezes of its own native Orient, in refreshing our spirits.

Digitized by Google

NOTES ON ROCKY MOUNTAIN CONIFERS AS ADAPTED TO CULTIVATION IN THE CENTRAL NORTHWESTERN STATES.

BY DR. C. C. PARRY, DAVENPORT.

The confusion which has so long reigned in reference to the specific characters, and geographical range of the Western North American *Conifers,* is at best in a fair way of being satisfactorily settled by the combined labors of botanical collectors, scientific botanists, and zealous horticulturists. Heretofore when the systematic botanist was obliged to depend upon imperfect dried specimens, hastily gathered from remote districts, often carelessly mixed, to define nearly related species, it was next to impossible to escape errors; then also when horticulturists raised living plants from a limited quantity of seed, the origin of which went back twenty to fifty years before their real character as trees could be reasonably determined, the long lapse of time, no less than the different conditions of growth in their cultivated and native *habitat*, necessarily infused a leaven of doubt and uncertainty in fixing the exact species. Now, however, when collectors can reach with comparative facility the native haunts of these forest denizens, and living plants can be transported with ease to the most distant localities, we have the means at hand to correct the errors of the past, and systematic botanists, with ample material in their hands, can, as far as nature will allow, properly define and describe species. The most competent of living authorities on the subject of North American *Conifers,* Dr. George Engelmann, of St. Louis, has lately published some of the results of his life-long labors on this class of plants, and the present writer having had unusually favorable opportunities for observation over wide districts in our far-western forests, takes this occasion to bring together some of the results arrived at, with special reference to the adaptation of certain species for cultivation in this now, central district of the United States.

The Rocky mountain *Conifers,* comprising in this geographical range the mountainous district lying between the great plains on the East, and the eastern base of the Sierra Nevada, include seventeen

Digitized by Google

distinct species unequally divided among five genera, which may be tabulated as follows, viz:

PINUS { *ponderosa*, Dougl. (Rocky Mountain Yellow pine).
contorta, Dougl. (Twisted Cone pine).
Balfouriana, Murray (High Mountain pine).
flexilis, James (Rocky Mountain White pine).
edulis, Engel. (Nut pine).
monophyllos, Torrey (One leaved, Nut pine).

PICEA { *Engelmanni*, Engel. (Rocky Mountain White pine).
pungens, Engel. (Sharp-leaved spruce, formerly Menzies spruce).

PSEUDOTSUGA—*Douglasii*, Carriere (Douglas spruce, or hemlock).

ABIES { *sub-alpina*, Engel. (Rocky Mountain fir).
concolor, Lindl. (White fir).

JUNIPERUS { *sabina*, L. var. procumbens.
communis, L. (Dwarf cedar).
Virginiana, L. (Red cedar).
occidentalis, Hook (Western Red cedar).
Californica, Carriere, var. *Utahensis*, Engel.
pachyphloea, Torr. (Thick-barked cedar).

In regard to the pines proper, including the above six well marked species, it may be noted, that all of these are peculiar to western North America, and with perhaps one single exception, viz.: the South-eastern Nut pine (*Pinus Edulis*) extend in varying amount to the Pacific coast.

None of these however are likely to prove desirable for cultivation, as ornamental or timber products, though possibly all may prove sufficiently hardy, to endure the climatic changes here experienced, being in their native locations subject to wide extremes of heat and cold, moisture and drought.

Of what are ordinarily known as spruces we note two species of *Picea*, and one *Pseudotsuga*, heretofore in most English and American scientific works included in the genus *Abies*. All of these are likely to prove valuable acquisitions either as ornamental or tree products, through the entire northern belt of the United States.

The first of these (*Picea Engelmanni*) has been fully tested, and proved hardy in our trying climate, being alike invulnerable to cold and prolonged summer heat; in its native forests it forms a stately tree, with smooth cylindric trunk, covered with a reddish scaly bark; its foliage rather dense, occasionally inclined to droop, and of a bright vivid green color; its topmost tapering branches in the season of seeding, which generally occurs on alternate years, exhibiting copious masses of reddish brown cones, one and one-half inches in length, which drop their light winged seed after the first severe frosts, the empty cones persisting more or less till the following season. It is an

Digitized by Google

even, rather rapid grower, attaining in favorable locations a diameter of two to two and a-half feet at base, and a height of seventy-five to one hundred feet. Its wood is soft, white and easily worked, being often designated by lumbermen as "White pine."

The second species (*Picea pungens*), lately distinguished by Dr. Engelmann, from the Pacific coast species, long known as "Menzies spruce," is remarkable as its name implies for the very pungent character of its stiff pointed leaves, well recognized as such, by any who have had occasion to climb the tree either in quest of seed, or birds' nests. Full grown trees attaining a height of fifty to eighty feet exhibit a rather stiff outline, very regularly branched low down the rapidly tapering trunk, its upper spire in the fruiting season abundantly garnished with pendant cones two to three inches in length of a light brown color, and their papery scales; the very fine seed is retained more firmly in the opening scales than the preceding species, and is more easily secured; the trunk is clothed with a rough reddish bark, and the timber often shows a twisted grain, is coarse and not adapted for carpenter work. Its value as an ornamental tree will consist in the symmetry of young growing specimens, often showing a beautiful silvery lustre in its foliage especially adapted to ornamental lawns.

The third spruce which has lately acquired the formidable botanical name of *Pseudotsuga Douglasii* is the only known representative of the genus. It has the most extensive geographical range of any spruce on the continent, extending from the Eastern Rocky mountains to the Pacific coast, and from Alaska to Mexico! Wherever met with it is regarded as the most valued timber product, on account of its strength, durability and length of trunk.

As a growing tree it is readily known by its comparative broad foliage, as distinguished from its nearest ally the eastern hemlock; though less graceful in port and pendant spray than this graceful denizen of our eastern woods, it is not destitute of either symmetry or grace, and sends up its spire of spreading branches to a great height in favorable locations; when of a more stunted growth showing an oval outline, with branches low down to its base; its singular bracted fruit is ornamental both in its green growing state, and its perfected cones; its bark is thick, dark and corrugated, abounding in tanning material: the solid timber is made up of a large proportion of dark colored heart-wood, being especially adapted for heavy timber work, or railroad ties.

Digitized by Google

These desirable qualities having been long recognized especially from Oregon specimens, its cultivation was early attempted, and much regret was expressed that it did not prove hardy in the eastern United States. It was in this state of the case that a small shipment of seed collected by the writer in 1862 from the eastern Rocky mountain districts, fell into the hands of some eastern nurserymen, who found to their surprise that the few seedlings raised from this source proved entirely hardy, in marked contrast with others of the same species growing side by side derived from Pacific coast seed. This inherited adaptation to our eastern climate might indeed have been reasonably expected, but a knowledge of the fact has been unfortunately delayed, till brought out by this accidental discovery—hence we may confidently look for a successful growth of this valuable timber tree in our central and eastern districts. It is also a matter of congratulation that with all the necessary changes of botanical nomenclature, this noble tree of the Northwestern forests still commemorates the name of one of our earliest and most courageous botanical explorers, David Douglas.

Of the two firs represented in the Rocky mountain district, the more common species closely allied to our eastern balsam, has been recently distinguished as *Abies sub-alpina,* Engel. In its native home in the higher Rocky Mountains, it is a tall tapering tree, with rather short twiggy branches and smooth trunk, abounding in blister-like cavities of clear balsam. Near its summit, in the fruiting season, masses of upright deep purple cones are conspicuous, which on maturity drop their scales, leaving the stiff central cone. There is nothing in this particular species rendering it more desirable for cultivation than our common eastern species.

The second species of Rocky mountain fir, *Abies concolor*, is more abundant in the south and west, its most central location being in the Wasatch mountains of Utah. It differs from most other species of the fir tribe, in its irregular branching habit, its deep furrowed trunk and broad foliage of a dull green color; its large cylindric cones are of an apple-green color. This species is likely to prove hardy, and on account of the peculiarities above specified, would prove a desirable addition to this class of ornamental evergreens. Its timber, moreover, is of a more durable character than most other species of the fir tribe.

Of the other six remaining *Conifers* of the Rocky mountains, included in the genus *Juniperus*, little need be said. Two of these, *J. communis* and *J. sabina* in the form of low or prostrate shrubs, are met with in all high northern regions round the globe.

Digitized by Google

Our common red cedar *(Juniperus Virginiana)*, the most valuable of all, occurs in greater or less abundance from the Atlantic to the Pacific, and from the Hudson's bay to the Mexican gulf, and wherever encountered, whether as a stunted shrub clinging to rocky precipices, or a tall tapering tree in sheltered ravines, it exhibits its usual character of sharp pungent foliage, and deep red, fragrant, durable wood. As a wind-break on our western plains and prairies, it is far too little appreciated, and he will prove a public benefactor who can devise some simple means for cheap and rapid propagation by the million.

The three other species enumerated, viz: *J. occidentalis*, *J. Californica* var., and *J. pachyphlœa*, are peculiar to our southwestern arid districts, and though presenting some peculiar and attractive arborescent features, are not likely to be adapted to eastern cultivation, except in certain limited districts where, no doubt, eventually, their horticultural value will be fully tested.

In a subsequent paper I may take occasion to mention some of the most desirable forms of Rocky mountain shrubbery, adapted to cultivation in our Central districts.

HEDGING.

BY MOORE BRIGG, WYOMING.

Gentlemen—In submitting a short report to your Society, I am compelled to say that hedging as far north in Iowa as the 42d parallel has not thus far proved eminently successful. As a system for farm fencing, or the construction of durable stock barriers on our farms, it is gradually dropping out of use.

There are several operating causes tending to this result: *First*—The severe winters have destroyed confidence in the Osage orange, which has thus far stood higher than any other as a natural and effective plant for hedging. Again, the construction or growing of a good hedge entails labor and close attention at a season of the year when the time can with great difficulty be spared from other farm duties. And, again, that which operates more strongly than any other one

Digitized by Google

cause against the live fence, is the barbed wire fence. Its cheapness, ease of construction, durability, and adaptability to the farmer's leisure time, have almost revolutionized the fence question. Our farmers seem to have become careless and slovenly to all systems of agriculture in which they do not see immediate profits as the results of their labors.

Again, on the other hand, we have a few hedges that are fine stock barriers, strong, attractive to the eye, and seemingly durable. These in time may have their influence in again turning the current in favor of live fences. My own impression is, that all things considered, a Honey locust hedge, properly grown and well trimmed, is the cheapest and best fence in the world for that part of Iowa north of the 42d parallel. The Osage will make fence quicker and full as strong, but here we can not have the confidence in its longevity that we could wish, on account of its half-hardy nature. The Barberry has astonished us in its results in growing into a good hedge. I have 20 rods of Barberry hedge near my house, which is now eight years from the seed, and as firm and strong as any farmer could desire, and a very thing of beauty, being well trimmed. On this hedge I have never known a twig injured by winter. But there is one great drawback to it in my opinion. Since the starting of this hedge, I have not known a square rod of wheat or oats within half a mile of it that was worth the harvesting. Invariably a black rust strikes the grain before ripening that prevents further maturing of the grain. I think there is no question about this matter, as I have watched it for six or seven years at my own cost, and to some extent of my neighbors, and I have observed that in a field of grain growing near the hedge, the further I go from the hedge the less the damage from rust. On this account I do not dare recommend it for a farm fence.

Hedging for ornament or for the adornment of the grounds about our dwellings, is a matter on which too much cannot be said. The Barberry, Norway spruce, and Arbor Vitæ are eminently successful for this purpose. Hardy, easily grown, easily trimmed and kept in order, and withal very attractive to the eye. A few such lines of hedge about each of our farmer's homes would transform this prairie region into a land of beauty. I think many in setting evergreens for ornamental hedge fall into the error of setting the plants too close. For Norway spruce I would set three feet, or three and one-half feet apart, and for Arbor Vitæ, I would set two and one-half or three feet apart. At these distances they become in a very few years so interlocked in

Digitized by Google

their growth that it becomes impossible to tell the locality of the setting of each plant. And finally, this like everything in regard to ornamenting a home, requires to be done with neatness, taste, and an abundance of good common sense.

MARKET GARDENING IN NORTHWESTERN IOWA.

BY J. U. KELLENBERGER, FORT DODGE.

Climate—Rather dry; main rains between middle of May and middle of June; frequent, strong, continuous winds, mostly north or south.

Spring—Unpleasant, raw, strong, winds; few clear, sunny days.

Summer—Excellent; air bracing, nights mostly cool; great pest, mosquitoes, not the little singer of the south, but large, and a torment nearly day and night.

Fall—Generally an early freeze, then a long spell of nice weather.

Winter—Generally, dry; cold, piercing wind—not much snow. Highest temperature in seven years' observation, 104, July, 1878; lowest, thirty-two below zero, January, 1874.

Soil—Creek bottoms, sandy loam; best for the greatest variety of vegetables; river bottoms more sandy, especially good for such crops as require quick, warm soil; prairie, black, sticky, very unpleasant to cultivate, will withstand drought better than wet; especially good for cabbage, celery, and cauliflower; for the latter, the best soil and climate we ever found.

Plowing—We plow deep, and subsoil whenever possible; we have never found a plow since we gardened here, that did the work to suit us. Fall plowing has some disadvantages here, the winters generally being dry, little snow, the heavy freezes pulverize the top soil very fine, and the strong wind blows the soil away in one place, and piles it up in another; we had a strawberry field entirely ruined in that way.

We sow everything possible with a view to horse-culture, as the hand labor is more expensive, and hard to get.

Digitized by Google

As to implements—we use one sixteen-inch, iron beam, steel plow, one two-horse gate harrow, one subsoiler, one planter, one eight-inch one-horse plow, one five-toothed, four-inch reversible steel-bladed cultivator, one hand harrow, one No. 2 Planet seed drill (I have tried various pattern but the above suits us best), the same with one Planet hand cultivator (we consider the above two the most important implements for the market gardener); we have numerous other implements but do not consider them essential.

We practice level culture whenever possible, no ridging; shall try Irish and sweet potatoes the same way next season for an experiment.

Vegetables that we at present find best for us:

Lettuce—White Seeded Tennisball, for hot-beds and out-door, sure to head.

Radishes—Deep Scarlet Turnip, Long Scarlet, Chinese Rose, Round Black Spanish, the latter we found the only real winter keeper; we have never found a real good summer radish; the Golden is best in quality, but the color is against it; and where is the market gardener that has not found out what the appearance of a vegetable had to do with its sale?

Cabbage—Jersey Wakefield, Fottler's Brunswick, Premium Flat Dutch. In the cultivation of this vegetable we differ with the doctors in one point, that of not planting a piece of land twice in succession to cabbages. We have a piece of prairie land which has been in cabbage for six years, and last year we raised two crops of first rate cabbage on it, as follows: We first planted it to Wakefield; when we stopped cultivating we run the single chisel of the scarifier through the center of the rows, and planted Flat Dutch in them, and as each row of Wakefield was marketed, we cultivated the space made vacant. We know a district near Lake Constance, Switzerland, that has been planted to cabbage longer back than the oldest inhabitant can recollect. The district goes by the name of Kabisland (Cabbage Land), and I have never seen finer cabbage raised anywhere. There are certain pieces of lands especially adapted to some special vegetables, and if the proper food is supplied, can be run in the same kind to good profit.

Celery—Dwarf White, and Henderson's half-dwarf. The latter has given us the best results. We sow celery in hot-bed and in open air; prefer out door plants. When we transplant celery, we plant it where it is to remain; that to be banked we plant in rows six feet apart.

Cucumber—White Spine, for hot-bed and pickles; the Prolific proved

Digitized by Google

a great bearer, but produced bad shaped pickles; too short generally, with one big end, and turns yellow when quite small.

Beets—Bassano for beet greens, and for bunching we sow the Egyptian in hot-bed, and transplant, trimming both ends when planting; this is one of our most profitable crops. For late crop, Dewing Blood Turnip.

Corn—Early Minnesota and Stowells' Evergreen; have tried the Egyptian, but found Stowells' best.

Beans, String—Black Wax; have tried the Golden, but it proved inferior to the black; we tried this year the Southern Prolific and considered it the best snap bean we ever ate; only it is a pole bean.

The Lima—We use the common lath and nip off the end as the runner reaches the top.

Melons, Water—Phiney for the five cent melon. Ice Cream next; for large specimens, Haskell's Excelsior beat them all, but we find small and medium melons the most profitable. We find more boys with nickles or dimes in their pockets than quarters.

Cauliflower—Henderson's Snowball, Lenormand's Short Stem. This vegetable we have raised here on the prairie soil to greater perfection than anywhere else, we have tried. Out of 600 plants this fall not half a dozen failed to form good curds.

Onions—Early Red, and Yellow Danvers. Our experience has caused us of late years to give the bulbs more room, so we thin them, rows eighteen inches, four inches in the row.

We plant watermelons in rows twenty feet apart, fifteen feet in the row. Muskmelon fifteen feet apart, ten feet in row. We were skeptical for a while as to such distances; but having attained such excellent results we shall continue the practice.

I have entirely omitted the hot-bed for the reason that the construction and management of ours differ in so many points from the general practice, that a separate article would be necessary, to illustrate the matter properly. I can only say here, that we found this section very difficult for the management of hot-beds, but we construct one now that overcomes the obstacles encountered.

Digitized by Google

REPORT ON VEGETABLE GARDENING.

BY J. SEXTON AMES.

Mr. President—I am less accustomed to writing than with the details of garden work and management; but I will try, in accordance with the wishes of the secretary, to give a few suggestions that may be of use to beginners.

I will first mention the Lima bean. By general consent it is considered one of the luxuries of the table; but it is not generally grown, as it is supposed to be difficult and troublesome to produce. Recent trials have demonstrated that it can be grown without poling. By this plan the trouble and expense of poling are dispensed with, and the crop is ready for the table earlier in the season, yet continues until frost comes. As soon as the climbing tendrils begin to form they are clipped off, and this process is continued until the bush habit is established. The clipping can be rapidly done with a Dutch sickle. I do not urge that the crop will be greater, but I do say that a plentiful supply may be thus grown with little trouble, and the first pickings are ready for use earlier in the season. A main requisite in the growing of this crop is to put off planting the seed until the ground becomes permanently warmed.

The tomato is another luxury of the table not well understood as to its needs and habits of growth to secure best results. It does best on moderately fertile soil. On very rich garden soils the vines are rampant in growth, and the fruit fails to set and mature in a natural way, and it is specially liable to *specking* and *rotting*. On such ground the vines, in every respect, are more troublesome to manage. On good corn soils the fruits may not grow quite so large, but it ripens earlier, and the quality is much better. As to varieties, it is best to stick to the tried and true ones until we are very sure that some of the newer candidates for favor are more valuable. The Acme, Hathaway Excelsior, and Trophy, are good enough for the President if properly grown.

It is important, if home-grown seed be used, to plant the varieties in strictly isolated positions. The Acme is hard to excel when from

Digitized by Google

pure seed. But if grown near less perfect varieties its seed the next year will produce mongrel fruit.

Asparagus also is usually not well managed. We find a little sod-bound bed of this delicious and health-giving vegetable on about all our homesteads, but its little stringy shoots are a poor apology for the great tender shoots from a well-kept bed. The bed should be deeply cultivated and heavily manured when the seedling plants are set, and it must receive good culture and top-dressings of manure and salt each year. In watching the growth of this plant the past season I noticed a great variation in the size and quality of the shoots from different hills. Later in the season I noticed that the hills giving the strongest shoots bore the staminate blossoms, and the weaker hills the pistillate blossoms, followed by the clusters of fruit. Careful attention will be given to this subject another year. If it is proven that the pistillate plants are most valuable it may pay to propagate by division of these hills.

In regard to such root crops as parsnips, carrots, and beets, it will be well to note that the common practice of hilling them up as growth progresses is specially objectionable. A better plan is to give level cultivation, thus avoiding the fibrous roots near the crowns.

As the intention is not to try to cover much of the ground presented by the great subject of vegetable gardening, I will only add a few notes on some of the promising potatoes not widely known, though really most of them may prove more profitable for field culture:

Grinnell—This variety, originated I think by John Grinnell of this State, is promising as an early variety of choice quality.

The Wilson, Snowball, and Prairie Flower, all seem desirable additions to our summer list, and are worthy of trial. Of the later varieties not well known, I do not yet know which to place at the head of the list.

The *Fox Eye*, so far, seems likely to take the place of the Peach Blow. It is much like the White Peach Blow, fully as good in quality and earlier to mature in autumn. It attracted much attention at the last State Fair.

Victor—This also is very promising as a late variety. In growth, size, yield, and quality, it is hard to find defects. Its color may be against it for market.

White Chief—This, like the Fox Eye, is of the Peach Blow type, and is worthy of trial.

Digitized by Google

Of the deep eyed, large potatoes of good quality, I will specially name Indiana Russet, and Bermuda. The first of these is becoming popular for shipping south, and the latter is very similar in growth, quality, and appearance. Brownell's Eureka is another deep eyed sort, worthy of trial as a market variety, if such varieties as Indiana Russet become popular in the markets. Alaska is still another variety of this large growing, deep eyed class; all of which are vigorous growers, good yielders, and of good quality.

We have, among the eighty-four varieties taking the premium at the State Fair, grown on the College Farm, a number of smooth eyed varieties for use in autumn and early winter, but it is not yet evident that any of them will supersede well known sorts, such as Early Rose, Early Vermont, and Snowflake.

CHINESE PEACHES AND FRUIT.

Hon. Geo. F. Seward, United States Minister, Peking, China, under date of June 28, 1879, writes as follows:

Your note of May 4, has been received. It will afford me much pleasure to serve you in the way indicated, and after the peach season I will collect pits and send them to you as suggested. Dr. S. W. Williams, of New Haven, Connecticut, is familiar with the fruits and cereals of this region, and in case, after conference with him, you learn of him any other way in which we can serve you, please command me. Yours very truly.

GEO. F. SEWARD.

Hon. S. Wells Williams, who spent several years in Northern China, under date of September 1, 1879, writes as follows:

In reply to your queries respecting the fruits and cereals of Northern China, I can only give general statements. Some of the fruits, if they could be successfully introduced into this country, would form a valuable addition to our list of edible fruits, but I think much time and care will be necessary to transfer them. There are some varieties of the pear called White pear, and Strawberry pear, which are unknown in this country. The first is considered by some to be the finest fruit grown around Peking. It is quite globular, white, and juicy. The other is more like other pears in shape. One is called *Pei li;* the other is the *Kuang li*, and gets its name from its taste. The peach is common, and both its forms are larger than ours in the United

Digitized by Google

States. One of them is a cling-stone, has a solid flesh and is not very juicy. There are three kinds of plum grown near Peking, but none of them are first class in quality. I think the blue sort would become improved and equal the best we have. One of the best fruits there is the apricot, and the enormous quantities brought to market show its excellence and use as food. The kind of persimmon grown around Peking is as large as a pippin, and the flesh firmer than the more juicy kinds grown farther south in China. Another fruit giving some promise is the edible Hawthorn *(Crataegus)* of which the people make an acid jam; it is easily cultivated. A delicious kind of crab apple is reared to a limited extent, but it does not enter into market fruits as much as into the list of sweetmeats.

Most of the fruits I have mentioned are cultivated in as high a degree of perfection as any of the fruits of other countries, and you may be quite satisfied if you can obtain them in as good a state as they are there found. I think that China is the native home of the apricot, plum, persimmon, peach, and pear, though the evidences are not complete. I took some pains to send seeds of the White pear, oat, and persimmon to the Patent Office at Washington, but the attempt did not succeed. It will take knowledge, time, and money, to bring the importation of these fruits to a successful issue, and perhaps then you may be disappointed in the first attempt. You are somewhat in error in supposing there is any parent stock differing from the generally diffused, cultivated varieties. The grape is also grown extensively in the northern portions of China. The seedless grape is common at Peking. The cherries are small, but good in quality, and might bring some good results by crossing and grafting. Respectfully yours.

S. WELLS WILLIAMS.

CHILI PEACHES.

Under date of September 22, 1879, J. D. Baldwin, of Ann Arbor, writes as follows:

I forward you to-day a basket of Chili peaches, with pits in the bottom. I wish you to see what the fruit is like. I wish you to plant the pits in your experimental grounds, and I feel anxious to have them tried still farther north on the prairie, in order to test fully their extreme hardiness. The main thing is to plant on the highest ground where the air drainage will be good. I consider this as important in fruit growing as land drainage. Please report to us the results of the experiment.

J. D. BALDWIN.

NOTE—The pits will be duly planted in the spring and results reported. If the Chilian peaches came from the north of China as suspected they may be useful in some parts of Iowa.

Digitized by Google

DE SOTO PLUM.

The following disinterested opinion of this native plum may be worth noting, from the Secretary of the Clayton County Agricultural Society:

PROF. J. L. BUDD—*Dear Sir*—We have a variety of plum in this county which was first discovered in the ravine near the mouth of which is built the village of De Soto, in Wisconsin. We call it De Soto for this reason. I think it has not been much disseminated, but it richly deserves to be, as it is surely far ahead of any native variety that has been distributed. It is considerably larger than "Miner" or "Wild Goose," and vastly better flavored. This variety is distinct from any and all the native plums I have ever seen in the character and flavor of the skin, which is entirely destitute of that astringent, acrid acid taste peculiar to the species. Either for dessert or culinary use the fruit is superb. The tree is perfectly hardy and a bountiful bearer.

The Miner plum is here a very shy bearer; is thick skinned, and only second rate in quality. But on the other hand it is a good keeper and little troubled with the curculio.

I will send you scions for trial on the College Farm if you wish. I am growing some seedlings of the De Soto. I will report in due time the behavior of the trees and the character of the fruit.

Very truly yours,

A. C. ROGERS.

NEW CRABS FROM CANADA.

Mr. A. Wood, of Barrie, Canada, writes as follows, under date of November 29, 1879:

I mail you herewith some scions of the desirable new fruit which I grew from seed. I think you will find the fruit to come fully up to the opinions expressed by our fruit committee in our annual report. In fact the committee did not see the fruit at its best. The samples they saw and tested were overripe. The tree has the appearance of a crab, but the fruit the flavor of our best apples. It will be valuable in localities like yours where extreme

Digitized by Google

hardiness is indispensable; but if I lived in a milder climate I should still plant it, because I do not know any other variety I could plant that would give me as much good fruit with as little trouble. It has a peculiar flavor which makes it an excellent preserve; so good, indeed, that I have no recollection of tasting anything better.

To prevent confusion it will be necessary that it should have a name to distinguish it from other trees. I therefore propose to call it Margaret, that being the name of the lady who sowed the seeds from which it came.

Yours truly,

A. WOOD.

NOTE—The fruit committee of the Fruit Growers Association of Ontario, report very favorably on this new hybrid. One of the members reports: "To my taste it is just as pleasant eating as many of our dessert fruits. It is pleasantly subacid, with a smooth, fine grained flesh, and remarkably fine flavor. I should like to see this fruit disseminated in some of the colder sections of the country, as I think it would by its hardiness and good quality meet a want much felt."

SARNIA CRAB.

We have the following letter in regard to this new candidate:

Your favor is received. I have much pleasure in forwarding you the scions of the "Sarnia" crab. I have no doubt it will be found suitable for your climate. I have asked a nurseryman to propagate it to distribute in our own western province of Manitoba. I sent some specimens of this fruit to the Farmers' Club of New York, and they report as follows:

"This is a large and beautiful crab, forwarded from Canada by the originator, T. G. Vidal. This apple is a seedling, a fine bearer, and the fruit is excellent. It was acknowledged to excel all known varieties in this country."

It is a strong and handsome grower, and the fruit is larger than any other crab, I believe. It resembles in shape and color of flesh the Spitzenberg. The outside is wholly dark red, like the darkest part of an Astrachan, and it is covered with a bloom like a plum when fully ripe. The wood of the Sarnia grows with a graceful curve downward, and it is strong and thick in its terminal shoots. I am, dear sir,

Yours truly,

TOWNS. G. VIDAL.

DUCHESS SEEDLINGS.

Mr. G. P. Peffer of Pewaukee, Wisconsin, has been longer engaged in systematic crossing of fruits than any man in the West. Several of his seedlings will beyond doubt be added to our list for general prairie cultivation. Three of his seedlings we have in the State confirm Mr. Peffer's views as expressed on previous pages.

Digitized by Google

Clark's Orange—Is a seedling of the Duchess fertilized by Belmont. The fruit medium to large, nearly round like an orange, perfectly regular without rib or wrinkle; skin yellow, covered partially with carmine and vermillion stripes; flesh white, juicy, sub acid; good for dessert and cooking, keeps well into midwinter. The fruit and scions were exhibited for five years in succession at the Wisconsin State Fair, and received the first premium at each. It seems entirely hardy as far as we have known it tried in our State.

Peffer's Winter—Is a seedling of Duchess fertilized by Gray Winter Pearmain. It is reputed much like the above, but keeps longer.

Pewaukee—Is also a seedling of Duchess rapidly coming into favor in Wisconsin and Iowa. It may not be quite hardy on our extreme northern prairies when root-grafted, but recent experience is much in its favor as to vigor of tree and size and quality of fruit.

Peffer's No. 1—Now we believe named *Oakland*—we had supposed a seedling of Duchess as it has the Russian style of leaf, bud, and habits of early maturity of tree. But it is stated that it is a seedling of Perry Russet fertilized by Tulpahocking. Whatever its origin, it seems perfectly hardy and a fine grower. I have this day (February 16th) tested two fine samples of the fruit and unhesitatingly pronounce it an acquisition. In size, shape, color and flavor it reminds us of Rhode Island Greening. It should be tried in different parts of the State.

PROPIGATION OV NEW AND HARDY VARIETIES OV APPLES.

BY PETER M. GIDEON, OV EXCELSIOR, MINNESOTA.*

Mr President and Brother Frute Growers ov the state Horticultural Society ov Iowa—Greeting:

It is with plesure I relate my experience in frute culture, and in soduing I wish it distinctly understood, that anything in last years re-

*Friend J. L. Bud, ure card at hand. I hav adopted the reform mode ov speling and wil allow ov no olterations. Old custom worshipors cant swerve me. If my mode of speling cant stand return the article undefaced.

My articles hav tu be printed as I rite them, or not printed at ol. Surtan u wil never get one ritten in any other stile With respect Peter M. Gideon.

Digitized by Google

port, that conflicts with ideas and theories herein-after exprest, wer unlucky slips ov the reporters pen. And therefore, tu giv a more definite synopsis ov my trials, thair results, and my deductions therefrom, I shal revew the subject—the production ov nu and rare varieties ov apples from the seed, and with what results I wil relate as breafly as the the subject wil admit ov.

My first attempts at frute culture in Minnesota began 26 years ago, by setting 450 trees in orchard, consisting ov thirty varieties ov apples, a good assortment each ov pears, plums, cherries, and quinces, with the planting ov one bushel ov apple seed, and one peck ov peach pits, and each year thereafter for eleven years, planted eastern and southern apple seed, and never les than tu gro a thousand trees, and tu da but thre trees remane. Those thre being from our first planting ov crab seed, but not a tre ever withstood one ov our grate climatic extremes, that had no crab in its composition, tho seed wer tried from ol the best varieties north, east and south. The grashoppers, the leaf lice, and the blite kild many, but the grate ruin came from the extremes ov climate. Nor wer the first setting and the seedlings ol I set and lost in that space ov time—hundrads wer obtand ov various ones, but ol went in the common ruin.

But since the first 12 years I hav planted only home grown seed, ol more or les crab relation, with results that would encourage the most disponding.

The first seed planted wer from the Duches and the Cherry Crab, and later from the Weltha and a seedling crab, and the grater portion now in bareing—sum thre hundred or more. The avarage being ful better than Transcendent, and sum ten or a dozen first clas apples, in seson from Aug first tu first ov Feb, and as hardy in tre as our native oaks.

We hav had quite a number of seedlings tu cum into baring at four years, from the seed, more at five, the great mas at six, and but fu go past nine years without fruiting, and those ov later planting not yet in fruiting count up intu thousands, and ol from seed of our vary best varieties. Those in frute r from the seed ov summer, fol, and urly winter apples, and in time ov ripening vary but little in sezon from the parent apple, tho grown in close proximity tu long keeping varieties, that bloomd at same time. Tho the cros did not produce a single long keeper, it produced many tender trees thru the crab or hardy apple seed, tho in sum instances perfect crabs in appearence ov tre. While other trees wer purfecly hardy from same lot ov seed, tho many ov

Digitized by Google

them represented the more tender surroundings in tre and size ov frute and especially so in regard tu the Blue Pearmain, a tre differing as widely from the crab as any other, yet an almost exact reproduction from crab seed, so fur as leaf, habit ov growth, and size ov frute but not in quality or time ov ripening, tho some wer even better in quality.

In crosing the common apple with the siberian Crab, a mas ov motely mungrels is the result, no tu seed being furtilized frum ol surroundings exactly alike, so that no tu in ol we hav grown r exactly the same in tre and frute, or in leaf or habit ov growth. The Duches is no ecception, not once has it reproduced itself in frute, leaf, or habit ov growth. So varied is the furtalizeing ov a hundred mungrel varieties, each tu a grater or les extent commingling in, surtin ingredients ov thair leaf, tre or frute nature, that a result—a compound that when developt culd not wel be in ol its parts, or even exactly in any particular anything that had ever bin before, or that culd posebly cum after. For in a promiscuous mungrel mus as r our seedlings, u ma find the shades ov everything in the vicinity, yet nothing exact, and even ov sum not in vicinity. One crab seedling was almost an exact Tetofsky in leaf, habit ov grouth, size, form, and color ov frute, but not in flavor, tho a Tetofsky had not bloomd on our grounds for sum years after that seed had bin grown. And only in one instance did the Weltha reproduce itself in tre and leaf, or so near as to pas for a ginuine Weltha tu a common observer, but in frute was the size ov a quails eg. And on top ov one tre is the Weltha and a genuine crab seedling, that not one man in 50 culd tel the difference, yet the crab seed wer raised ful 150 yards from any Weltha tre that was in bloom at the time the seed wer grown. So we see that from the seed ov as genuine a crab as we ever gru the Weltha was as nearly reproduced in tre and leaf as ever occurd from its own seed, and no possible chance ov a mistake in either case.

From a hundred comminglings compounded, and that hundred each a mas ov heterogenious mungrels, where is the science that can trace the mother parent out? It cant be done! As 5,000 trees on our grounds testify.

I got the seed that produced the Weltha, as cherry crab seed, and from later familuarity with the seed ov that variety, I am positive thare culd hav bin no mistake—surtan it is, ov cherry crab origin—a mungrel without a mark ov parental origin in any exact form, nor is it capable ov transmiting its exact characteristics tu its progeny. Nor

Digitized by Google

culd any definite results occur, when a hundred, or a thousand mungrels commingle in every conceiveable part ov leaf, tre, and frute.

And without this motely mungrel, and the siberian crab as a basis, frute groing here would have bin a failure. For ol the hardy varieties ov the northeast and the Canadas wer tride, both in tre and seed with entire failure. And he who tries tu gro a more hardy clas ov apples than the Famuse, Plums cider and McIntosh Red, without a cros with the siberian crab wil fale—water cant rise higher than its fountain, nor can hardines surpas the origional stock. And why such prejidice against the siberian crab and its croses, as is manifested by many, and these same ones hunting after Russian varieties? When it is a fact that ol the hardiness that is found in the Russians is in thair crab connexion. The siberian crab is a native ov Northern Russia, and F, K, Phenix ov Bloomington Illinois, has traveld extensively in Russia, expresly tu studdy thair fruts, and he says, the Russian varieties ar hardy just in proportion tu the amount ov siberian crab in thair composition, and so runs my observation, and but fu ov them hardy enough tu stand here as root grafts—sertan the siberian crab is a Godsend to the Northwest.

No tre without crab in it wil pa its culture here, if on its own roots, whilest by the use ov crab roots, or crab stocks sum can be made tu yeald paing crops that have no crab in them, and that culd not survive an extreme winter on thair own roots. And ol varieties ov the common apple, that I hav tride take wel on the crab or crossbred seedling roots, tho sum fale tu form a good junction when grafted above ground, and consequently would be ov short duration. And as tu Blite. With us the common apple blites as bad, as dus the crab and its croses. But whare extreme hardines ov tre is not an item, I se no advantage in useing the crab in any form, but simply impruve upon those best adapted tu ure severel soils and climate—that is what we r duing here, And by our proces we hav origionated a succesion ov first clas varieties runing from first of Aug tu the first ov Feb, and each as hardy as native oaks.

And in the attanement ov our present succes, we hav solvd the problem as tu the proces by which we can originate long keeping varieties, makeing a succesion the year thru, and in tre perfect iron-clads. seing the tenasity of the seedling tu ripen its frute at or near the same time the parent apple did from which the seed wer taken, and ol our iron-clads being summer, fol, or urly winter, our proces tu gro long

Digitized by Google

keepers, that r iron-clads, in tre, is tu plant alturnately in ro, an iron-clad and a long keeper. The long keeper not being purfectly hardy, we top graft it on a hardy crosbred seedling stock, that makes its wood growth, and stops its sapflow urly, thus compeling the later groing top tu ripen up for winter, and thereby obtane fruit that culd not be had otherwise, And the seed being furtalized by a natural flow of pollen from the surrounding ironclads, we shal get sum seedlings purfectly hardy, and ov good quality ov frute, and in seson with the mother apple from which the seed wos taken. The same law opperating, that gave us only urly apples from the seed ov urly ones, tho crost with long keepers, that gave form ov tre and size ov frute tu the ironclads seedling, And with that vu, and tu that end is the state orchard organized and conducted—the object, hardy long keepers. The state has purchast 116 acres ov land adjoining our farm, and on that the experimental orchard is situated, and on a hi point ov the shore ov Minnetonka lake, and at a point whare the most magnificent landscape and water vu is had that the state affords, and that tu, a point whare no naboring orchard can affect by a flow ov pollen. And in the orchard nothing but the vary best is insurted ov the long keepers, and ov the ironclads that r tu give form to the forthcuming tre, r our vary best hybreds in quality ov tre and frute—nothing being admitted inside tu adulterate, and nothing outside in harms reach, And as fast as better is cum at, it wil be insurted, and the more objectionable wed out—thus, on, on a lasting instution, impruving as time lapses, on. But it wil take 8 or 10 years ere the first results can be had, as the first trees wer set a year ago last spring and tha hav tu frute and the seedlings cum intu bareing, and until that time we wate and hope.

NOTES OF EXPERIMENTATION WITH THE APPLE.

BY SILAS G. GOSS, BORDER PLAINS, WEBSTER COUNTY.

Mr. Secretary—In accordance with your earnest request, I send you a few notes of experience, hoping they may prove valuable. I start by saying I have no trees to sell.

Digitized by Google

Tetofsky—Trees from Bloomington, Illinois, in 1872; grows fast when young, root-grafted, if well manured and cultivated; appears as hardy as any crab; flowers three days after Transcendent crab, and is more fruitful in seasons with late spring frosts; grows well top-grafted on the faster growing kind of thorn, not overgrowing enough to injure, and develops fruit buds early; grows too slow on seedling apple and Transcendent crab. Summer-budded on Red Astrachan, or Whitney's No. 20, it grows much faster.

Fourth of July—Obtained of Dr. Stayman, Kansas, in the spring of 1874; is a slow grower, and does not blossom or bear very young budded on old seedling trees; drops its leaves early; very hardy in blossom. May 6, 1879, it was in blossom two days later than Transcendent crab, thermometer 31 degrees next morning; leaves and flowers frozen stiff; yet it bore very full; fully ten times more than Astrachan or Transcendent. This was practical proof to me that this Russian is hardy in blossom. The fruit is about a week earlier than Red June, but not as good in flavor.

Red June—Set in orchard in 1857. I find that when top-worked it is twenty times more profitable than root-grafted.

Red Astrachan—Set about same time; bears young and full; needs high culture. Red Astrachan is hardy when top-grafted. On neglected trees the fruit is small; scabs a little some years.

Sweet June—Too tender root-grafted; profitable top-worked on hardy stocks where a sweet apple is wanted.

Large White Sweet—Scions from Ohio; seems hardy, top-worked on Transcendent.

Seedling No. 2—Seed from Ohio. Original tree here is twenty-four years old; bore rather young; limbs come out very low; average grower; some tinged in color of shoots in spring of 1874, but has fully recovered; bears fruit every year; grows well on Soulard crab; flowers about time of Gros Pomier and Fourth of July. It bears good, sound fruit in the worst seasons for late spring frosts. Fruit large, resembling Pewaukee in outward appearance. Season last of August and early September.

Rubicon—Bark and buds much like Tetofsky. I grafted it in a thrifty crab seedling, and it has borne some of the prettiest fruit I ever saw, but quite acid. Tree sheds its leaves early, and is a slow grower. Season about the same as Red June.

Stayman's Summer—Tree from Dr. Stayman, in 1872. Tree is hardy here root-grafted. Recovered from the hail-skinning of May

Digitized by Google

17, 1876, which killed trees of Astrachan and Talman Sweet on the storm side.

Seedling No. 6—From same seed as No. 2. We call this "Minus leaf," on account of its naked twigs, except on their terminal points. The fruit buds are equally peculiar in irregularity of expanding. The blossoms appeared from May 6 to 15, in spring of 1879. This is perhaps a main reason why it fruits every year. Its fruit also ripens irregularly, some in autumn, and some keeping well into winter.

Oskaloosa—From Dr. Stayman. Has so far been hardy here, root-grafted, on black prairie soil. The blossoms stand frost well. Fruit, sub-acid; average size; season early winter; quality better than Baldwin.

Seedling No. 70—This is a hardy, sweet variety; stood unscathed the winter of 1872–3, and matured a fine crop of fruit in 1873 and made a good growth the same season. It bore a fine crop in 1879, which sold for from ten to thirty per cent higher than the other sweet varieties; fruit large, much larger than Talman Sweet, which it resembles in color and markings of skin. On some specimens it shows a dull red on one side. Season late fall and early winter.

Pewaukee—Scions from Mr. Peffer, of Wisconsin. It is one of the coming apples for late winter use. Ben Davis will find in it a rival. Top-worked on Transcendent, it outgrows the stock, but not enough to prevent making profitable trees. The lower limbs take root readily when covered. The trees seem hardy here root-grafted.

Grimes' Golden—In top of Transcendent grows too slow, especially after a hard winter; but bears fruit.

Many other varieties have died out, but I have other sorts on trial which I may report.

THE PANSY.

BY MRS. JAS. DAVIDSON, MONTICELLO.

The pansy *(Viola tricolor)* was imported from Europe, and originally called heartsease. The French called it pensee, from which comes the name pansy. It seems to be a law in this busy world that nothing

Digitized by Google

desirable is attained without labor. This is especially true of pansy culture; it is equally true that they amply repay our care and attention.

They will grow and bloom when indifferently cared for; but if *fine, large flowers* are desired, certain conditions must be complied with. Several years experience, as an amateur, have taught me, that the plant requires a certain location, treatment and soil to bring it to perfection.

Good plants can be procured from the florist, or grown from seeds. My own method has been, to sow seeds, about the first of April, in a shallow box of fine, mellow soil; sprinkle a little soil in the seeds, barely covering them. Place upon the top a couple of thicknesses of newspaper, the exact size of the box; keep the paper wet till the seeds sprout, then uncover and gradually give sun and air.

It is necessary to have strong, vigorous plants, and much care must be exercised at this period to keep the young plants strong and healthy. Sun and air must be freely given. If kept too damp and warm, they will grow slender and sickly.

As soon as danger from frost is over, remove to the open ground; water freely, and blossoms will soon follow, which will grow larger as the weather grows cooler. Seeds sown in the open ground in June will bloom late in the fall.

In the location and preparation of the soil lies the secret of success in pansy culture.

First, the location should be on the north side of the house; allow no shrub, tree, or other obstacle, to obstruct the sun's rays; the object being to get the full benefit of the morning sun, and at the same time be protected from from its mid-day heat.

Secondly, the soil. Mark out the required dimensions of the pansy bed; dig down eighteen inches; remove the dirt and replace it with leaf-mould, sand, and well-rotted manure. If leaf-mould is unattainable, get as light and porous a soil as possible; the earth immediately under a turf that has been undisturbed for years, is excellent.

The pansy likes plenty of water, but it must not be allowed to stand on the bed. If the soil is light and porous, as it should be, there will be little danger. Liquid manure should be used once a week. The soil can hardly be too light and rich for pansies.

If flowers are the chief object, do not let the seeds ripen. If, however, you desire to save seeds, select a few plants for that purpose, and keep the pods picked off from the others, the same plants not pro-

Digitized by Google

ducing as large flowers, if permitted to ripen seed. After blossoming freely, pinch back, and more buds will soon follow.

The pansy endures over winter, if properly protected. This is done by throwing coarse litter and straw over the plants; care should be taken not to smother the plants, while covering sufficiently to protect them. In the spring, uncover them, and your plants will be green and bright, ready to respond to your care and attention.

They will blossom early, and have a profusion of flowers. New ones should be started by again planting seeds in April. Plants are not satisfactory after the second season; young plants producing the largest and finest flowers.

There is no recreation more invigorating and interesting than flower culture. Three promoters of health: exercise, pure air, and pleasant emotions, are most happily blended. And among the many beautiful flowers that should be cultivated, few will give more pleasure than the lovely, saucy, charming pansy.

LANDSCAPE GARDENING.

BY DR. WM. O. KULP, DAVENPORT.

The subject of landscape gardening is one that people in new countries are not much interested in, for it savors of luxury.

Twenty years ago the people of Iowa were more interested in making bread and butter through *swine* culture—than in horticulture, floriculture, or landscape gardening. But now we have grown to manhood, are therefore ready to pay attention to gratifying our better nature, and if we cannot enjoy all our improvements ourselves, we can leave them for the enjoyment of others, for the tasteful yards we lay out, and the trees and shrubs we may plant, will live long after we are laid among those who are gone to their long rest. So while our good intentions, and many of our good deeds will be forgotten, these improvements will ever remind those following after us, of our good taste and culture, and will bless us.

Digitized by Google

The old style of making all paths and roads in a straight stiff line, and setting trees, shrubbery and flowers in the same sort of rows, is now obsolete, and no longer considered in good taste. The drives and foot paths must now be winding; flower beds must no longer look like so many graves, right angles must be avoided, instead we must have curves and ovals. Trees must be planted with a view to their effect upon the finished grounds and their surroundings, and not in a haphazard manner or in straight rows. The same rules are to be observed in planting shrubbery and flowers. With these rules in our minds we are permitted to exercise our own individual tastes; with nature's resources at hand, we can make our own yards and flower gardens as pleasing and diversified as we are capable of.

It is therefore not expected that I should give any peremptory rules to be observed in the improvement of private grounds. I can only make suggestions, and thus throw myself open to criticism, and the subject for discussion. Where the grounds are large, the modern style of massing in groups, roses, flowering shrubs, shade trees, and evergreens, when done in good taste is in quite pleasing contrast to the old custom of planting in rows and in stiff set order. In order to produce the most pleasing effect in grouping shrubbery, one should be familiar with their habits of growth, hardiness, etc. Those of taller growth should be placed in the center of the group, while those of more dwarfish habits should be placed towards the borders. The same rule should be observed in massing evergreens, while with shade trees a better effect is produced by reversing the rule—let the shade become more thick and of lower growth towards the center. Where the grounds are less extensive, this same idea can be carried out, but in a more contracted form, more pruning is necessary. I shall dwell more upon the massing of flowering shrubs and roses, leaving the evergreens and shade trees to your imagination. We will suppose the drives and paths are all laid out in graceful curves. Select a place near the carriage entrance, drive a stake in the center of a plat you wish to use for the planting, fasten your tape line to the stake. Now if you wish to occupy a space twenty feet in diameter, step from the stake ten feet (or more if you wish to make your bed larger); at this distance wrap your tape line around a sharpened stick and begin marking the distance from the center, and thus pass around the center stake until the circle is finished, when with the spade the sward can be cut at your mark and removed from the entire bed, and the ground gotten ready for the plants. This same rule of marking around the center should

Digitized by Google

be observed in planting, contracting the line after planting outside rows, until the bed is filled. When pruning is done the good effect is destroyed if plants are not set in exact circles, or ovals, or any form that may be chosen at the start. Let the center be occupied by either a lilac or snowball—first circle from center syringa; second circle, wiegelia rosea, and wiegelia rosea, variegated foliage alternately; third circle, calycanthus; fourth circle, ever blooming hybrid perpetual roses; and for border, spirea Fortunii. These must all be pruned so as to preserve the symmetrical form of the group, else the beautiful effect is lost.

Grass or weeds should not be permitted to grow among these shrubs. By applying a bounteous supply of well rotted manure as top dressing each spring, and some slight winter protection, this happy family will live and flourish, and give pleasure to all beholders for ages.

There are many other varieties of shrubbery that are equally fine, that might be used in the same manner in other parts of the grounds. The glory of all grouping of this kind is not reached until we group the Rose family. This "queen of flowers" is now brought to such great perfection, that its beauties and sweetness are not surpassed in nature. The same rules described above in marking beds should be observed when roses are to be massed, except that the ground should be considerably more enriched, and a deeper cultivation of soil is necessary. There are varieties in the hybrid perpetual family that are perfectly hardy, and that flower the season through, that if massed all nature cannot produce anything more beautiful.

The old custom of letting roses grow up in a wild thorny mass must not be followed now-a-days. Especially is it not permitted where they are massed. They must be trimmed each season, say to within one foot of the ground. We should remember that the most perfect rose is produced upon the shoot that springs up from the roots annually, and not from the sprouts that come out of old wood. With proper cultivation and mulching there is no flower on earth that gives such exquisite pleasure as the rose. In *massing* roses I would recommend that one color, only different in shades, should be used in the same beds (except where white are used), *i. e.*, let one bed be dark maroon in center, and dark red first circle from center; second, a shade lighter, and so on until bed is filled. The same rule holds good where pinks are used, dark pink in center and lighter towards outer circle. A separate group should be in every yard, containing all colors, with the white as predominant.

Digitized by Google

Roses planted in hedge rows are very beautiful; they can be placed along drives or walks, or between the lawn and garden. The climbing rose is also not to be forgotten; trained upon verandas, trellisses, or posts, their beauty cannot be excelled.

The massing of tea roses in the *flower garden* is the general custom now. This class is the sweetest in the Rose family, but too tender for our winter climate, but their sweetness and beauty repay any one for the extra care demanded.

We next come to the flower beds. These should be tastefully laid out, not all of one size, or of one form. *Here*, right angles should generally be avoided—they should generally be raised somewhat above the sward in the center, while the edges should be several inches lower than the border. They should never have a raised border of turf or bricks; simply let the sward come up undisturbed, and form the border.

In selecting plants for the flower beds, a great deal of taste is necessary in order to produce a proper effect. Where assorted plants are used, the taller ones should occupy the center of the beds. All beds should have some low growing plants as border plants, or as a line of demarcation between the grass and flowers. It may be formed of coleus, or alternanthera, or anything else of low growth. The flower bed proper can be occupied by a mass of one colored geraniums, or verbenas, or heliotrope, or anything else desired, with astonishing effect. Generally very showy colors should be selected for massing, or else pure white. It is not best however to have much sameness in one yard, so I would not advise more than two or three mass beds in the same garden, but would not permit the planting of different families in one bed. Let the verbena bed be wholly composed of verbenas. Geraniums the same; so of all the families through. The Coleus family is becoming so cheap now, that all may enjoy their beauty in the form of ribbon beds, or beds of various designs according to the taste of the gardener. The colors are so numerous and decided, that their landscape effect is very fine. I would urge their greater use to all that love the beautiful. I might extend this paper to a volume without exhausting the subject, but for fear of taking up too much time, I will, in closing, urge all to pay more attention to beautifying private grounds, and door yards. Remember that "a thing of beauty is a joy forever."

Digitized by Google

THE FENCE PROBLEM.

GEO. W. OBERHOLTZER, IN SIOUX CITY JOURNAL.

There is no question discussed among the farmers that has attracted more general attention than that of fencing their farms. The post and rail fence, while it makes a good and reliable fence, costs a great deal in the first place and is a continual drain upon the purse to keep it in repair. Especially is this the case where the winds are as high as they are in the northwest. One of our best Woodbury county farmers, with a well fenced farm, adjacent to the timber a few miles below Sergeant Bluffs, said to me last summer, that the cost of keeping up his fences consumed all of the surplus profits of his farm. If this is the case under such favorable circumstances, of course for our homesteaders with limited means and living on the prairie far from timber, the post and rail fence is out of the question.

But says the theorist, "Why not abolish all fences?" A few years ago the herd law was passed, and by its provisions the owners of stock became responsible for their depredations. Stock was watched and herded by day and corraled at night. It seems to me that the herd law with its unfenced grain fields, while valuable as a temporary expedient, does not meet the demands of the case. With unfenced crops there is a constant sense of insecurity. The farmer feels worried both day and night, week day and Sabbath, for fear of injury to his crop. When it is injured by the inroads of cattle, the probable damages recovered from the owner of the live stock by lawsuit is a poor recompense for the loss. A still stronger argument against a permanent herd law is that its tendency is to drive stock out of the district where it is enforced. This was very forcibly shown in the Floyd valley, between this city and LeMars, where you saw fine herds of cattle before the herd law went into effect, and afterward you would see only a cow and perhaps a sickly calf or two picketed near the house. It is evident that if the farmers of northwestern Iowa are to make any money, that money must largely come from the sale of their live stock, and anything that tends to decrease the quantity of live stock kept in this country cannot but be regarded with disfavor.

Digitized by Google

It seems to me that the solution of this problem is to be found in the live fence. Judge Whiting, of Monona county, perhaps the first, largest and most successful of the tree planters on our prairie farms, long ago strongly and urgently advocated the planting of trees in wide shelter belts around the farm. I cannot better present to you this idea of a live fence than by giving you a description of the shelter belts upon his farms: These belts are from one to twenty rows in width. The rows are four feet apart, and the trees stand about two feet apart in the rows, making 4,356 trees to the acre. The ground was thoroughly broken and cultivated before the cuttings, yearlings or seeds were planted. The first and second years the Judge cultivated his trees as carefully as he did his corn. The third year they were laid aside with one plowing, and since that they have had no cultivation. Over five miles of these belts were so planted that in a few years he commenced using the standing trees as fence posts. By the use of the barbed wire and a little change in the staple, the use of these live posts is a perfect success. Along one of the highways is a fence of a single row of cottonwoods, standing close together, which is both calf tight and bull strong. These trees are from forty to seventy-five feet in height and from twelve to twenty inches in diameter, according to their ages, which vary from ten to fifteen years. When first planted they were little seedlings a foot high and no thicker than a rye straw. The rampant growers, as the cottonwood, willow, soft maple and box elder, are put on the outside of the wide belts, while the walnut, elm and ash, and other more valuable trees, can be planted inside of the vanguard of the rapid growing iron-clads.

Judge Whiting's timber belts furnish him everything he needs for lumber on his farm, from a pea stick or fence post to a fine log for cord wood or sawing. Perhaps the crowning feature of this plantation are the black walnut belts of twenty rows standing four feet apart, with trees two feet apart in the rows. These are grown from the nuts, seven bushels of walnuts with the shucks on being planted to the acre. These walnut trees are from three to six years of age, and vary from ten to twenty feet in height. Under the shelter of these belts the Judge has a fine bearing apple orchard of low spreading trees, which generally reward him with a good harvest of fruit.

These shelter belts not only make a good fence and grow valuable timber, but they greatly increase the product of the crops growing in their shelter. Judge Whiting is very strongly convinced of the truth of this statement. He says that the influence is more perceptible

Digitized by Google

every year as his trees grow higher. The grain starts to grow earlier in the spring, matures earlier in the summer and fall, is less liable to injury by sudden changes in the temperature, hail-storms or late frosts, and consequently both the quantity and quality of the crop is increased. It must be confessed that the 800 acres of corn, averaging 70 bushels to the acre, that he raised last year, was a strong reason for the faith that is in him.

While all cannot expect so rapid a growth on upland farms as in the rich, moist soil of the Missouri valley, yet there are few prairie townships where a shelter belt will not grow in a few years so that, with the aid of a barbed wire, it will make a good fence, and in time give valuable timber and good shelter to the crops.

Then there are hedge trees, such as the box elder, honey locust and white willow, which will in a few years grow into a good live hedge fence. Upon this point I can give the experience of Mr. Marcus J. Coombs, of Liberty township, in this county, as given me in a letter just received from him. He sowed the seed of his box elder hedge in the fall of 1875, in the rows where they stand. When the plants came up they were thinned out so as to stand eight to twelve inches apart in the row. Three years after planting this will be a good fence by setting willow stakes close to the trees about two rods apart and putting on one barbed wire. Mr. Coombs has one and a-half miles of box elder fence, which, at the age of six years from the seed, will make him a good, substantial fence. He recommends that the plants be grown in the garden or nursery, and when one year old be transplanted into the hedge row, setting them out one foot apart.

Mr. Coombs also has two miles of the honey locust or three-thorned acacia, which he strongly recommends as being the best fence for the northwest. Part of his plants he bought from the nursery at three dollars a thousand, and the others he raised himself from the seed; but he thinks it best to buy the young plants from the nursery. It has proven itself perfectly hardy, and at six or eight years from planting makes a cattle proof fence, and can be used much sooner than that with the aid of a single barbed wire. He also has fifteen rods of the well known and rapid growing white willow, of which we have so many good hedges and fine wind-breaks all over the northwest that I need not describe it. Of course these hedges need to be carefully planted in mellow ground, well cultivated in the spring for three or four years, and it would be much better if they were thickly muched with straw, leaves or litter during the summer and winter. Mr. Coombs says most

Digitized by Google

emphatically that his hedge fence has paid him. The cost of rebuilding his old post and rail fence would have been much more than that of planting, raising and caring for the hedge plants, and he always feels sure after heavy windstorms that his fence is secure.

FORESTRY ENTRY.

WALL LAKE, IOWA, Sept. 18, 1879.

J. L. BUDD, *Secretary Iowa State Horticultural Society*—I hereby make application for premium offered for the greatest number of trees planted in groves; intrinsic value of species considered.

I hereby submit statement of trees planted, and mode, and cost of culture. The grove was planted on northwest quarter, Sec. 19, 87, 36, by Elwood Tatum, in the spring of 1879:

Catalpa, 852—number now living, 847; honey locust, 1,812—number living, 1,742; of ash, elm, honey locust, and soft maple, 2,215 were planted—living, 1,981.

COST—Total cost of plants	$11.50
Cost of planting and culture	18.00
Total cost	$29.50

The cost of the plantation is only approximate, as I raised the trees and cultivated them. The work was done at odd times.

I hereby certify that the above statement is correct, to the best of my knowledge and ability.

ELWOOD TATUM.

The usual sworn statements of witnesses counting the trees, etc., were furnished, and the Executive Committee awarded the premium for second best collection of trees planted, $20, to Mr. Tatum.

Digitized by Google

Office Notes, Selections and Queries.

OAK LEAVED MOUNTAIN ASH.

KNOXVILLE, IOWA, Oct. 7, 1879.

FRIEND BUDD—Yours at hand. The tree you inquire about, on the grounds of the Iowa Agricultural College, planted by myself while there, is undoubtedly the *Sorbus Quercifolia;* one of the most beautiful ornamental trees yet introduced in our State.

I first imported it from the nurseries of Andre Leroy, Angers, France, about twenty years ago. I never received a tree on its own roots. The French work it on the hawthorn or Angers quince. I have usually used pyrus aucuparia as a stock. It does not do so well on Pyrus Americana. I have never tried it on apple stocks.

I do not know that the seeds of Quercifolia will grow. I have known no plants to come up under my trees though they produce seeds quite abundantly. On the stocks named it is easily budded.

Yours very truly,

JAMES MATHEWS.

NOTES ON HARDY FRUITS.

LETTER FROM DR. HOSKINS.

NEWPORT, VERMONT, Oct. 20, 1879.

Yours of 15th is received with much pleasure. The *Rural New Yorker* will soon have cuts of seven varieties of successful Canada apples, selected at the recent Montreal and Abbottsford exhibition. One of these will be the Canada Baldwin. There is an "out" in everything, as an old friend of mine is in the habit of saying. The "out" in the Canada Baldwin is a tendency to bark-blight or scald in some situations of the cold north. It is rather too small for a first-rate market fruit. In quality it is almost "best," and

Digitized by Google

in productiveness it is good enough. The name is unfortunate. It is unquestionably of the Fameuse type, and in my opinion a Fameuse seedling, and its original name of Winter Fameuse ought to have been retained.

The Black Oxford has failed here, but it does well at Oxford, Maine, and is popular. I always thought well of the quality of the fruit.

Mr. A. Webster, of East Roxbury, Vermont, who was the first to fruit Borsdorf (402), goes back a little on his comparison of it in quality with Peck's Pleasant. In a recent letter he says: "Borsdorf has borne a little for three years. It has not justified my first impressions of its quality, and although decidedly good it is not equal to Peck's Pleasant in fineness, tenderness, juiciness, and flavor."

Regarding the best of the Canada varieties, there is not one of them, keeping well into winter, with which they are perfectly satisfied. I think Canada Baldwin stands highest. They are still on the lookout for the coming apple that shall equal the Baldwin as a commercial apple, and be entirely hardy in tree. After careful comparison of notes I cannot make up my mind that any of them are superior to our Magog Redstreak and Scott's Winter, and I shall in the spring, after waiting a long time for something better, fill up the remaining one and-one-half acres of my orchard with these varieties. I will put in most of Scott's Winter. Though not so large a Magog it is as good a keeper, and so handsome in color that it will bring a good price in market after the imported Baldwins are out of the way. It is in its prime in April, and the loss in keeping it is not usually five per cent. It is rapidly growing in favor, both with growers and buyers, in this section. Magog, though considerably larger, and selling well, does not keep longer than Baldwin, and has to be sold in competition with that variety, while it lacks the popular red color.

I have some hopes that McIntosh Red may take the place of Magog, yet I fear it will not keep as long as claimed. My trees have not yet borne. Mr. Webster has had some fruit, and writes me that though much larger than Fameuse, it has the defect of all apples of the Fameuse type: it *spots* in unfavorable seasons. But if it will keep, notwithstanding the spotting, they need not ship any more Baldwins up here after it becomes plenty, as it is very much better than the latter in quality.

There were no new Russians of value exhibited this year, unless "Enormous," a very large, handsome, and good fruit, of the season of Duchess—may be so considered. "Switzer" is the best in quality of the Russians I have seen. It is surely good enough. It is of the color of Red Astrachan; season September.

I have none of the Asiatic fruits you speak of, but am waiting the progress of your experiments with much interest. I have little faith in any of the pears we now have for growing in this section. My Flemish Beauty—out for three years—yet look well. The general experience with pears here is that though they seem to do well for a few years, we get but very little fruit from them before they die of hard winters. Therefore, I think if we have any hope in this direction, it must be in your new Russian sorts.

Digitized by Google

We had some specimens of Moore's "Arctic" plum this year. Though not of the best quality I consider it desirable on account of extreme hardiness of tree.

We have no cherry that will stand except the old pie cherry. The Dukes will sometimes stand long enough to bear two or three crops.

I may note that the Miner plum trees have grown well and have blossomed freely for two years, but on account of spring frosts we have only a few specimens of fruit which are not yet ripe enough to eat, though nice for sauce.

Yours faithfully,

T. H. HOSKINS.

NOTES FROM JEFFERSON COUNTY.

Secretary State Horticultural Society—Dear Sir—I received last summer from our member of our legislature from this county the Report of the State Horticultural Society. I have been much interested and benefited by its careful and repeated perusal. It is really the most valuable thing of the kind I have ever got hold of. Indeed, it is exactly what I have needed, as I have been for the last thirty years trying to raise fruit on my place, and all this time I have been poking in the dark and experimenting at great loss.

I planted my first orchard of about two hundred trees, thirty years ago, and had the misfortune to plant largely of tender varieties. The result is that I have about twenty trees left out of the two hundred. Those living are now large, with tops spreading two rods. So I have learned that if we plant hardy varieties we should not plant them too close. Of the trees left the Fameuse stand ahead. All of these I put out are standing, except one Romanite all living; Red Astrachans all standing: Jonathan about half dead. My orchard site is on flat prairie, a little wet.

Only one tree of Rawle's Janet is now alive. They seemed to go by commencing to decay near the surface of the ground. Some of the Yellow Bellflower are yet alive, but they bear very shyly.

About five years ago I put out a new orchard of about four hundred trees, commencing now to bear some fruit. I propose to put out two or three hundred more next spring, though not very successful with the old orchard, and the new one has had some replanting every spring. I replant entirely with Ben Davis. As with the first orchard the hardy kinds keep their places. I give these notes as a part of a general record. We need the aid resulting from combined effort and interchange of experiences, such as given in your report.

Digitized by Google

I have put out about five acres of forest trees. I am anxious to get the *Forestry Annual.* I regret that I have been so late in finding out that we had such a valuable organization in our State.

I am, yours truly,

Baker, Iowa. EDWARD DAVIS.

NOTES OF EXPERIENCE AND OBSERVATION ON PRAIRIE TREE PLANTING.

BY H. C. RAYMOND, COUNCIL BLUFFS.

It is every man's duty to devote a part of his time for the welfare of his country and the community in which he lives.

It is an undeniable fact that the native forests, containing trees valuable for lumber, are being annihilated at an alarming rate. This fact cannot be fully realized, even when we read the figures, said never to lie.

Again, plant timber for your own profit. This selfish principle, of course, is the first and strongest inducement to plant timber, but yet the fact remains that future generations will reap the greater part of the reward of your labors; for I notice that people do not cut and slash down young and thrifty timber that they have planted with their own hands, as they do that of Nature's own planting. I am so filled with the idea of the necessity for timber planting in the greater portion of our State, that I cannot excuse any man who owns forty acres of prairie land, from planting a part of it to timber. No man is too poor financially to do it. No man is so rich that he has any moral right to neglect so evident a duty. It is not necessary, I will here note, to wait year after year for the purpose of finding out the best kind of timber to plant. Rather than wait let the settler plant what he can get hold of the easiest and at least cost. While this first planting is growing into value for shelter, fuel, etc., he will have time to study up the relative value of species for future planting. In the end, he will very likely find that his early planted cottonwoods and soft maples have proved, to him at least, as great blessings as catalpa or larch.

While speaking of cottonwood, I will say that Prof. Aughey, of Nebraska, seems to have arrived at the conclusion that groves made up

Digitized by Google

of cottonwood trees, will usually die out in from four to twenty years, and he thinks it best to plant them *intermingled* with other trees. I have grown them both ways, and the *facts are* that this tree will not grow to any considerable size when crowded together; the smaller trees will succumb invariably. When other species are crowded, the growth of the weaker trees becomes stationary, but they still for years *cling to life*. The cottonwood considers itself monarch of the forest, and is bound to rule or ruin; yet I can say of the cottonwood, that I have seen more timber on an acre of ground of it, than I ever saw of any other kind, or in any case of mixed timber. This was in Fremont county, Iowa, on the Missouri bottom. The trees were mostly from two to four feet in diameter, and so tall that you had to look twice to see their terminal branches. I did not estimate the average distance of the trees apart, but I think it was more than twenty feet, perhaps thirty. It is very probable that Nature planted one hundred trees on the space now occupied by one, but the ninety-nine had ultimately to give away to the *one* that was strongest. So when we plant trees four feet apart, we must not expect them all to grow to be four feet in diameter. The greatest number of trees I ever saw, attaining size to be valuable, on an acre, I saw in northern Michigan in a larch swamp. The trees, all larch, were of proper size for medium telegraph poles, and stood from six to eight feet apart on an average.

We have in Iowa settled down to the theory and practice of very close planting, viz: Three and one-half to four feet apart. This is considered a good practice, but we shall all probably err in leaving the trees *all to grow* longer than they should before we commence thinning. Planters will do well to make a note here in their book of remembrance.

I am decidedly opposed to the practice of indiscriminate mixing of species in plantations. If they were all uniform in habit and strength of growth, such a plan might be desirable. Each species, we find in practice, to have its peculiarities of growth, and no two of them will flourish for many years together planted as closely as is usually practiced. We can only make such mixtures successful, by giving greater space to each tree. The ultimate result might prove profitable, but the cost of culture would be greatly increased, and there would be no compensation in the way of *thinnings* for many years. This would be a weighty reason why this plan will not suit the fast living Iowa planter who works for quick returns, for fear he will die, or sell out the next year.

Digitized by Google

I notice that some writers are talking about *nurse* trees. As I understand the word, it means a stronger, watching over and protecting the smaller and weaker. If we apply this definition to tree planting, I think I should as soon engage a *lion* to nurse a *lamb*. If the nurse tree is near enough to the patient to be of some value, it will likewise prove a damage in evident ways, and if it is planted far enough away so as not to prove a damage, it cannot realize our idea of protection, unless we use evergreens; in which case, the moisture evaporated by the evergreens during winter might be of some advantage, and also a gain would be apparent in the way of arresting wind sweep. But who ever heard of using evergreens as nurses for deciduous trees? I have some European larch that have been nursed by ash leaved maples, until there is scarcely any natural substance or life left in the larch. I also have white pines that have been nursed by Scotch pines, and by comparing the two, it would seem the Scotch pine has grown fat by eating up the white pines. I could multiply such cases, but the limits of this circular will not admit. I advise planting each species by itself, giving each plant an equal chance, and then nurse them *yourself*. My observation has extended from northern Michigan to southern Texas, and from the Atlantic to the Missouri river; my experience has been ten years at this place, and these conclusions are founded on both observation and experience.

I herewith give measurements of several of the species which were planted by me ten years ago. I give the diameters, measured one foot above the surface of the ground. The plants were all about one foot high when planted. These figures are about what may be expected when trees are grown for timber. Isolated trees, or single rows, under favorable circumstances, are, and can be, grown to double the sizes here given: White maple, diameter eight inches, height thirty feet; ash four and a-half inches, height twenty-nine feet; abele or silver poplar, nine inches, height thirty feet; black walnut, five inches, height twenty feet; black cherry, six inches, height twenty-eight feet; catalpa, six inches, height twenty-five feet; white pine, five inches, height nineteen feet; Scotch pine, six inches, height twenty-one feet; cottonwood, nine inches, height thirty-five feet; ash leaved maple, five and a-half inches, height twenty-seven feet; butternut, five inches, height twenty feet; chestnut (nine years old, from seed), four and a-half inches, height twenty feet; elm, four and a-half inches, height twenty-five feet.

Digitized by Google

Of the evergreens for timber or wind-break, I would much prefer to grow the Scotch pine. It is most rapid in growth, and also the best able to stand all the extremes of our climate (excepting the Austrian pine), and makes valuable lumber. The white pine may be equally valuable when the air is more humid, but our air of the Missouri valley is hard on it when young, yet it can be grown if well sheltered from wind by other trees.

So far the black cherry *(Prunus serotina)* has not received the attention that it merits. It grows rapidly, the lumber for finishing work is highly prized, the fruit is valuable for the birds, and the wood is valuable for fuel and very many farm uses. In these degenerate days when everything we buy is adulterated, we should plant more sugar maple. The more independent each family may become, the better will it be prepared for famine, pestilence, peace, or war. The silver poplar is a good tree for the lazy man, for it will grow up as fast as he can cut it down, without the trouble of replanting. I have what I have supposed to be the hardiest catalpa, but it has not proved hardy enough to withstand all the vicissitudes of our climate. It is possible that repeated planting of seed may finally acclimate this beautiful and valuable tree. I am not an enthusiast in the culture of any particular species, but recommend planters to use *many kinds*, all of which have value, some perhaps for the immediate benefit of the planter, and some for the generations that may come after him.

FORESTS, WOODLANDS, TREES.

BY HON. SUEL FOSTER, MUSCATINE.

Our Government appointed a Commissioner of Forestry, Dr. F. B. Hough, in August, 1876, who made his first report December, 1877, just published by Congress and distributed over the country. The subject of the influence of trees in rain-fall, there treated, deserves the attention of farmers. Every farm should be divided into suitable lots of five to forty acres, making the divisions on the highest land for planting timber belts. The strong sweeping winds drive the dust from the soil, especially from the hills and ridges, and dry the moisture; and this exhaustion of water from the soil is evidently very great. Forests

Digitized by Google

keep the water from running off, and prevent the sun and wind from drying the ground.

The farmer can thus readily see how he can benefit his farm by planting wind-breaks, while, if his tree planting induces rain, the wind will be likely to pass it on to the adjacent or remote country beyond the reach of his patriotism. Besides the drying effect of the wind, which is more serious here in this level prairie country than it is in the Atlantic States, we find the blowing of the crops about and sometimes laying them flat, is a great damage to the crop.

WHAT TREES TO GROW.

No farm is complete without a wood-lot, and it is easier to raise one than to clear off one covered with the usual natural growth. When one plants his own timber he can have such as he wants. White ash is best for farm tools; black cherry for cabinet work. It will grow as fast as black walnut—the walnut roots are poisonous to the crops and orchard trees for some distance. Then, for post timber, the hardy catalpa has lately been more extensively recommended than any other tree. It is said by undoubted evidence, that it has been known to last in the ground, as a post, for more than fifty years. In proof of this, Mr. E. E. Barney, president of the Car Manufacturing Company at Dayton, Ohio, sent me a piece of catalpa wood which was taken from a post which has stood in the ground seventy-five years. This tree is a rapid grower, easily raised from seed, and easily transplanted.

The *osage orange*, our well known hedge plant, may be grown as a forest tree or wind-break in the south half of the State. It is a remarkably firm, heavy, strong wood, and valuable for many farm uses: for mallets, mauls, beetles, sled-stakes, pins, rake-teeth, and many such uses that are constantly arising on the farm.

I would not intermix different species in the grove, for some grow faster than others, and the slower growth is liable to be nearly lost by the overgrowth of the larger. But for wind-break of a few rows, there may be no objection to planting different species; planting the largest growers on the outside row, and so taper down with smaller growers toward the field.

Set some evergreens about the premises. They make the best wind-break. Set them on the north of the orchard and the buildings. Plant deciduous and fruit trees as early in spring as the ground can be plowed, and evergreens a little later. Some people do not have any luck in

Digitized by Google

setting evergreens. It is because they do not know how. Handle them carefully. If the ground is dry, use plenty of water. Keep the roots from drying. Plenty of wet straw or rags of gunny sacks about the roots will keep them moist. Make a mud-hole, and dip the roots in before setting. Dig the hole large enough to lay the roots out in their natural position; fill in the earth and poke it carefully underneath all the roots; when the roots are all covered, and the hole half filled with soil, dash in water enough to thoroughly wet and settle the dirt about the roots; if it is dry, fill in more dry dirt and tramp it hard that it may be firmly pressed on every part of the roots, for the roots must have the privilege of absorbing water, and every part of the bark of the roots will absorb where the moist earth comes in contact with it.

After the trees are set, mulch or cover the surface with any sort of litter, leaving earth on them to prevent blowing away. If drought comes in summer, water, but do not slop a little water on top of the ground, it is the roots of the tree that need the water; dig the earth away until you get near the roots, then pour in water enough to wet the ground thoroughly a foot distant around and beneath the roots, then fill in the earth and cover with mulch, and it will last a long time, and usually save the life of the tree and contribute greatly to its growth.

A few notes on the relative growth of well known species on my grounds may be useful. They are the results of actual measurement with line and pole, on March 6, 1879.

Hardy Catalpa—Twenty-two years from seed, height thirty-five to forty-one feet, diameter fifteen to sixteen and one-half inches.

Black Cherry—Transplanted from woods, twenty years' growth, height forty feet, diameter eleven inches.

Sugar Maple—Transplanted from woods, twenty years' growth, height twenty feet, diameter fourteen and one-half inches.

Soft Maple—Transplanted, twenty years' growth, height thirty-five feet, diameter sixteen inches.

Chestnut—From seed, twenty-four years' growth, height thirty to thirty-nine feet, diameter ten to sixteen and one-half inches.

Hardy Catalpa—From seed, four years' growth, height ten to twelve feet, diameter three to five inches.

White Pine—Two years seedlings, growth twenty-four years, height fifty feet, diameter nineteen inches.

Norway Spruce—Four year seedlings, growth twenty years, height thirty-four feet, diameter thirteen inches.

Digitized by Google

European Larch—One year seedlings, growth ten years, height twenty to thirty feet, diameter four to seven and one-half inches.

Scotch Pine—Two year seedlings, growth twenty years, height thirty feet, diameter sixteen inches.

Austrian pine grows much like the Scotch, but more stocky, not quite as tall, is deeper green in color and a more beautiful tree.

The larger catalpas have stood on rather poor, hard soil, and have not had as good culture as the four year old trees. As to the two varieties hardy and tender, myself and foreman were looking at them to-day, and we could not attempt to distinguish one from the other by the appearance of the bark and twigs. The hardy one grows thriftiest, and its time of blooming here is from 15th to 16th of June; while the tender kind blooms from two to three weeks later, the flowers of the early variety all dropping before a flower of the other has opened. The hardy variety has a larger and whiter flower, and the seed pods are much longer and less numerous.

The sugar maple is a slow growing tree from seed, until it is about five years old, when it begins to make top. In the hard, grass ground by the roadside, it grows, when once started, nearly as fast as the soft maple.

The black cherry grows nearly as fast as the walnut, and it is more valuable for cabinet work.

I think the white pine the best of the evergreens for timber plantations.

The Norway spruce is a handsome tree for planting near the house.

Do not try too many species, *but be sure to set out trees and set the best.*

TREE GROWTH IN GROVES OF D. C. SCOFIELD, AT ELGIN, ILLINOIS.

These notes are added with a view to showing actual results in timber growing on prairie land, very similar to the dry rolling prairies of our own State.

Mr. Scofield's trees stand on dry, black, prairie soil, with layer of clay at the bottom, under which, at a depth of about six feet, is found

Digitized by Google

coarse gravel. The growths here given, do not equal that of dozens of smaller plantations in eastern Iowa.

European Larch—Of all the species planted from 1858 to 1866, this is the most uniform in height and size in every situation, regardless of the kind of tree that is near it. No insect or bird has ever attacked these trees. The average height annually attained the first nine years of growth, was two and one half feet. In the fall of 1869, the severe freeze of October 19th injured the unripened leaders, checking extension for several years. The trees are now from 28 to 32 feet in height, the diameters varying with the space they occupy, the greatest being 14 inches, one foot from the ground.

Soft Maple—This tree promised well everywhere on my grounds during the first ten or twelve years; and some trees, in the most favorable situations, have made a diameter of 18 inches in fifteen years. It is liable to break with wind in summer and with ice in winter, and already in many instances, shows signs of maturity and decay. It is well adapted to wet soils, where it becomes valuable.

White Ash—Trees planted in 1856, of one inch in diameter, and seven feet in height, two rods apart, for ornamental trees, are now only equaled in beauty by the hard maple and horse chestnut. These have a height of 30 feet, and spread of limbs of 20 to 25 feet. Trees from seed planted in 1858, and transplanted in belts with larch and black walnut, have formed smooth, straight bodies, 25 to 30 feet in height, with diameters of from 3 to 4 inches.

Sugar Maple—Trees planted 20 feet apart, seven feet high, in 1856, now have a height of 25 feet, with a spread of top of from 12 to 17 feet; diameter one foot from the ground, 6 to 8 inches. Trees from seed planted in 1858, have a height of 20 feet, and diameter 3 to 6 inches.

In prairie soil, the growth of this tree is remarkably slow for 15 or more years, after which its growth is satisfactory. Trees planted near my grounds, 33 years ago, one inch in diameter, have now an average circumference, one foot from the ground, of over three feet, height 30 feet, spread of top 25 feet.

A tree of black cherry on same grounds, from seed planted 26 years ago, has a circumference of over five feet one foot from the ground.

Box Elder (Acer Negundo)—This tree is a remarkable grower. Some of my trees seven years from seed, have a diameter of six inches, with finely formed heads sixteen feet across. It is not liable to break by effects of wind or ice like the soft maple.

Digitized by Google

Black Walnut—Various experiments here demonstrate that this tree will succeed well on rich, dry soil, provided the cultivation is continued till the trees afford shade to protect themselves from grass growth. But on account of late habit of coming into leaf, if culture be not kept up for an unusual number of years for profitable forest management, the grass will destroy them.

Experiments also demonstrate, that when planted with early leafing species, to act as nurses, culture can be suspended in four or five years. The European larch seems well adapted for this purpose. It comes early into leaf, it is trim and upright in form, and it has a tendency to enrich the soil by its annual shedding of leaves. Already under the larch trees, I find a formation of more than an inch in thickness of rich vegetable mould, which proves a rich fertilizer for house plants. The sugar maple will also do well as a nurse for the walnut. An experiment here, of over thirty years continuance, demonstrates that the hard maple will make even growth with the walnut, unharmed by its presence. These nurses of the walnut, not only keep down the grass, but they secure a clean upright stem or trunk.

Elm—The red (slippery) elm grows rapidly; some of the trees, eight or ten inches in diameter, in thick plantations, begin to show signs of debility. It is not a success on dry grounds.

Sweet Chestnut—A total failure on prairie soils. I have but one tree remaining on my grounds, and I know of no other in this county. It stands twenty feet high, with diameter of six inches. It is preserved in slightly growing condition by forest protection around it. "Total failure" is written on all the efforts that have been made in its cultivation on prairie soil, while it grows satisfactorily on the light soils of the Mississippi bluffs.

White Pine—My plantation of this tree is from seedlings from the forests, obtained in 1866. They were from six to ten feet high in 1876; they were planted twelve feet apart each way, and intermediate spaces planted with Scotch pines for nurses. I cultivated until the trees protected the surface by their shade. My white pine trees of first setting, are now thirty to forty feet high, and where standing six to eight feet apart, they have a diameter of from ten to fourteen inches; but they have the same height with less diameter, where standing closer, denuded of side branches.

Digitized by Google

BEST MODE OF TRANSPLANTING FOREST TREE SEEDLINGS.

We have almost uniformly advised the planting of forest tree seeds where they are to stand permanently. But this is not always practicable, or indeed advisable. In transplanting, the plan of inserting the plants into a cavity formed by thrusting a narrow spade in the ground and pressing the handle forward, has been generally practiced. But careful growers of forestry belts and hedges, find that it pays bountifully to do the work more systematically. In reality, the best and rest method takes little, if any, more time and labor than the less perfect and successful mode of setting behind a spade.

Plow straight furrows four feet apart across the plat, running the plow as deep as possible. When ready to put in the plants, keep the team at hand, and deepen two or three furrows at a time, so the earth will be fresh and moist, by plowing back in each furrow with active boy pressing down on the plow beam. This gives a deep furrow with mellow dirt thrown up on both sides. In setting the plants, two hands work to the best advantage. Stretch a line over the center of the furrow, straighten the crooks in the furrow with a spade, and proceed to set the plants. One hand attends to wetting the roots of the plants, a bunch at a time, as taken from the convenient point where they are heeled in, and sets them upright at proper distance apart, pulling in the requisite loose dirt with his hands or feet. The other hand follows with a hoe, leveling up between the plants, and tramping the earth firmly around each plant.

Two hands in this way will soon put out several acres. After the plat is finished, cultivate with two horse corn cultivator or double shovel, depending on the height of the plants. About the middle of June, plow the spaces between the rows, by throwing the furrows towards the trees. A plantation started in this way, will usually make double the growth the first year made by those planted carelessly with a spade, and if the plants are in good order, not one in two hundred will fail to grow. If plants *barely live* the first season after planting, their growth will be feeble for several years, and they are liable to perish the succeeding winter.

Digitized by Google

AN OLD MAN'S TREE GROWING EXPERIENCE.

Thomas Lake, of Winnebago county, Illinois, settled on the bleak open prairies of northern Illinois when quite advanced in years; he is now over seventy years of age. His quiet relation of his experience in grove-making in the *New York Tribune* will be encouraging, we hope, to our beginners on our great northern prairies. He says:

"Although past seventy, I let no spring go by and fail to plant trees. I located on the open prairie, thoroughly exposed to the cold, raking winds from all quarters, and at times found it almost unbearable. I began by planting a row of hard maples the first spring. Then I commenced to prepare a strip of land for black locust, to cut off the north winds from my house and yards. The seeds in drills six feet apart, grew well; I took special care to keep them free from weeds. They soon drew the attention of passers by; applicants came fast and pressing for young trees. I parted with a few, but soon found if I satisfied all, I could have none left for myself. In a few years they grew large enough for posts, and as it was necessary to thin them, I cut out from time to time what I needed. When those left had attained sufficient height to make three or four posts each, the borers attacked them and very soon stopped their growth, so I concluded to have them all dug out; they furnished a choice lot of posts and several cords of fuel. In the mean time I had been growing quite a lot of young trees from the seed—black walnut, butternut, oak, maple, and some other kinds; they were now big enough to set out. I got the ground in good order and planted; they are to-day, some of them, thirty to forty feet high; we have been having nuts plenty for ourselves and to spare for many years past. My stock formerly suffered much, so exposed to the biting winds of winter; but since these groves have grown up, I often see them in the cold days stretched out and fast asleep in the yards, so I conclude it has paid a hundred fold in the comfort of the animals, to say nothing of our comfort and pleasure.

"I have quite a number of other trees growing on my premises, such as pine, fir, Norway spruce, cedar, etc., from thirty to forty feet high. Five or six years ago, learning that I could obtain European larch from Robert Douglas & Sons, of Waukegan, Illinois (who raise trees by millions, of all kinds; pack them so that they can be safely sent to the

Digitized by Google

remotest parts of the country, and are withal perfect gentlemen to deal with), I concluded to try how European larch would answer for our prairie, being well acquainted with its rapid growth and value in my native England, where thousands of acres have been planted within my remembrance. I bought and set out nine thousand, intermixed with evergreens, in rows four feet apart each way as we here plant corn; planted two grains of corn close up on the south side of each young tree, then about the size of a lead pencil, and about a foot high; cultivated both ways, kept the ground free from weeds for two years, as long as I could work a horse between them; since then, they have been allowed to care for themselves. To-day many of them stand from twelve to sixteen feet high, and four to five inches through. In a year or two more I will be able to thin out for posts or rails. I would advise those who are looking around for homes, not to let the open prairie scare them; I have found out long since, that where there is a will there is generally a way."

INTRODUCTION OF TREES INTO SOUTHWESTERN IOWA.

BY G. C. NEALLY, BURLINGTON.

The results of tree growing in Southeastern Iowa are perhaps best shown in the growing of specimens introduced from abroad; largely from the eastern portion of the Union, though to as great an extent from European countries and parts of Asia. It is true that a large number of trees are seen scattered here and there that have been preserved from the primeval forests, and at many of the homes in this section some of the finest arborescent forms are native elms, oaks or lindens. Occasionally a native tree or shrub is taken from the groves around here and transplanted, and not unfrequently seeds of the soft maple, black walnut and others are gathered in the neighborhood and planted in the nursery and other places.

Of the trees that have been acclimated in Southeastern Iowa, it may be said that they have been grown principally for ornamentation; with the fact in view, however, of the trees employed for wind-breaks and hedges and those cultivated for their fruit.

One of the striking peculiarities of the attempts to acclimate trees in Iowa is that trees from Northern Europe often prove more hardy

Digitized by Google

and adapt themselves to our soil better than any of our native trees introduced from the Eastern States. Marked illustrations of this fact can be noticed in the Norway spruce, the Austrian pine and the Scotch pine; these forming, with the white pine, the foremost popular species that have been chosen in the tree culture of the West.

If called upon to name the most striking and magnificent evergreen among all the others that have been acclimated here, doubtless the Norway spruce can justly claim the honor. We can point to three noble specimens in the suburbs of Burlington, thirty years of age, about forty feet in height, standing in full vigor. And scattered in different places in the surrounding country can be seen numerous other forms of the same species in various stages of growth. The three popular pines that have been grown in these localities might be said to almost compete in appearance with the Norway spruce; rivals of the latter in their general vigor and health, but yielding to the spruce in point of majestic appearance.

Turning attention to the other conifers, it is an interesting fact that the arbor vitæ, introduced from the Eastern States, has been grown here with success, but in the winter it is not apt to retain its bright green appearance as is the case with many of the other conifers. On the other hand, the Chinese arbor vitæ (genus *Biota)* preserves the rich greenness of its dress through the entire winter, and stands year after year in our Western soil, in full vigor and health.

The hemlock, as it is grown in this part of the country, finds the climate less agreeable to it than in its native haunts in New England and New York; the few that have been planted here showing rather a stunted growth. One specimen of the hemlock here, of about thirty years' growth, in a sheltered situation, has attained a height of nearly thirty feet. Another specimen planted at about the same time, but fully exposed to the wind and sun, has made a growth less than fourteen feet.

Of the evergreens that have been planted in Southeastern Iowa, if placed in the order of popularity that has been given to them here, they might be enumerated as follows: Norway spruce, white pine, Scotch pine, Austrian pine, arbor vitæ, balsam fir, red cedar, hemlock, black spruce, red pine, Jersey pine, biota, savin, Swedish juniper, common juniper, Cembrian pine, American yew, gray pine.

The European larch has been highly esteemed in these parts, as it has in many other portions of the West, and has been grown here almost as extensively as the four other popular conifers; vieing with

Digitized by Google

them in its grand proportions and healthy growth. In respect to the American larch, or tamarck, which has been grown to a limited extent in these localities, it has failed by far to reach the popularity and demand tendered to its European relative; the latter, of course, presenting a much finer appearance as a tree for the lawn and the avenue.

In regard to the deciduous trees that have been grown in this part of the country, the most noteworthy are the soft maple, hard maple, tulip tree, ash-leaved maple, and European larch. These, with occasionally a sycamore, chestnut, catalpa, linden, and golden willow, have been generally selected for avenue trees, though often planted among the evergreens on the lawn.

Taking into account the trees introduced into this region from more eastern portions of the Union, such as the magnolia glauca, magnolia tripetela, cucumber magnolia, virgilia, sweet gum, and Hercules' club *(Aralia spinosa)*, together with the foreign trees acclimated here, such as the Chinese magnolia (Soulange's), horse chestnut, sophora, cut-leaved birch, purple-leaved beech, Japan gingko; all these, though grown with success in this part of Iowa, are represented here by only a few specimens. That there are many trees and shrubs well adapted to this climate and soil not yet introduced, there can be no question, and that doubtless before many years the interest in tree growing will be at a higher mark there is every reason to believe. We may take the results of nursery sales in the west during the past seven years, compared with the sales in the same length of time before 1873, and this will furnish good illustration of the zeal in tree planting of late years.

It may be well to mention here one of the most conspicuous foreign trees grown in this section, the cut-leaved birch. Its fine, noble, graceful appearance, together with its hardiness, justly entitle it to the attention of all who are at all interested in trees. One fine specimen, near Burlington, imported from France in 1860, has towered to a height of about sixty-five feet, with a trunk three and a-half feet in diameter five feet from the ground.

While both the European and the American mountain ash are grown in this portion of Iowa, it is an interesting fact that the American species is not as much subject to the borer as the European species. The Spanish chestnut, and also the English walnut, have been planted in this section, but are not hardy enough for the climate here, and will probably never be included among the naturalized trees of Iowa.

The double-flowering cherry, from Japan, has been cultivated in this region, but for some reason it has failed to attract any particular atten-

Digitized by Google

tion. Also, the double-flowering apple, from China, has been a minor feature in tree-growing here, but I believe has met with but little if any demand. It is less hardy here than the double cherry.

The Paulownia, from Japan, is represented by three or four specimens. But it always is killed to the ground in winter.

Many are the interesting facts in reference to the introduction of trees into our State, and it is to be hoped that much more practical information in this respect, as well as more extended experience, will be gained in the coming years. As a prominent feature of this branch of horticulture, may be mentioned the numerous shrubs that have been brought from various portions of the world, and have found in Iowa an agreeable soil and climate; and valuable acquisitions are every year being made.

NOTE.—Mr. Neally, in a private note, says that he writes the above with a view to drawing out from the members of the Society information relative to trees and shrubs which have been introduced and successfully grown in different parts of the State, and to draw out suggestions as to ligneous plants which are promising for experimentation.

REPORT ON NEW, RARE, AND VALUABLE CONIFERS ADAPTED TO THE NORTHWEST.

BY ROBERT DOUGLAS, WAUKEGAN, ILLINOIS.

We are in receipt of your esteemed favor asking for our experience in testing the hardiness of "New, rare, and valuable conifers adapted to the climate of the northwest."

Candor compels me to say in reply that for nearly twenty years' hard and expensive work in this direction we have now on hand as the result of all this hard labor and expense a very large stock of *experience*, but a very small number of species of new, rare, and valuable coniferous trees; and yet I would not part with this experience for ten times its cost, for it has convinced us that we have got the debris about cleared away, and that the mine will assay well after all.

We have all of us been regretting that our beloved West—so well supplied with all the facilities for the production of the substantial comforts of man—produced very little for ornamentation, and we have been spending our time and patience in an attempt to discover ornamental conifers in the Himalayas and other remote parts of the world,

Digitized by Google

and latterly in California and all along the Pacific slope, and when we found that *this tree* would grow at an altitude of 8,000 or 10,000 feet, and that *that tree* would endure a zero temperature, we have reasoned from such facts that these trees would endure our climate. Sad experience has taught us that the thermometer is not a true test, neither is the altitude nor the latitude an unerring guide. We must have trees that are able to withstand a dry atmosphere. Of all the hundreds of thousands of conifers we have grown from seeds collected on the Pacific slope, not one tree has stood our climate seven years. Even Abies Williamsonii and one or two others from Alaska ds, failed like the rest.

An eastern editor stated that the man who would grow Lawson's cypress and Nootka Sound cypress in large quantity and at low rates would be a public benefactor. We grew them in very large quantity, but they proved tender like all the rest, and not only tender at the West, but generally all over the Northern States.

I confess I was sadly disappointed last summer when at Dr. Kirtland's old place, near Cleveland, in company with Mr. Meehan and Mr. Samuel Parsons, of Flushing, on my calling attention to a shabby weather-beaten specimen of Lawson's cypress, to hear them both say that it was as good a specimen as they had seen anywhere in the country of as large a size.

After looking over many of the finest old places, last summer, in Cleveland, Cincinnati, Rochester, Boston, New York, and south to Washington, with the special object of examining the conifers, I can scarcely call to mind a dozen specimens of the California conifers planted so freely twenty-five to thirty years ago, worth the ground they stand on, save and except a group of Sequoia gigantea on the grounds of Ellwanger & Barry.

Many fine European species are perfectly at home in the vicinity of Boston, that will not stand here. Abies Nordmanniana, one of the very best, is hardy at Rochester and Cincinnati, except that in some winters it loses its leader, but it seems to outgrow this habit with age, and is then even a better tree than if it had not been killed back. Much as I admire this tree, I cannot recommend it west of Lake Michigan, for I have never seen, and never even hope to see, a specimen reach the height of ten feet, as it kills back every winter.

A few European species, rare in the west, endure our climate, among which we may name Abies Sibirica and pinus Cembra, both dwarf in habit, slow compact growers, very desirable for small places and ceme-

Digitized by Google

tries; few if any plants in western nurseries, and not many in the eastern..

We are growing Abies Sibirica and Abies Schrenkiana in large quantity, as the latter is from the same locality as the former, and undoubtedly hardy, but as they are only one year old, it will be several years before they will become common in the west.

"A man never can appreciate the beauties of home until after he has wandered away," is a common but a very true saying, and as we have returned west after our wandering among the conifers of other countries, we can better appreciate the good qualities of our own. We find that our red and white pines compare very favorably with the Scotch and Austrian pines of Europe. Our white spruce is as beautiful and hardy as the Norway spruce, but we need all these kinds for variety. Our balsam fir will not compare favorably with the European silver fir, or the silver firs of the Pacific Slope, but we have the Abies sub-alpina of Wyoming, and its variety Falax, and the concolor of Colorado, the former of the habit of Abies Sibirica, and the latter of the habit of the California silver firs. We have the Abies Douglasii, of Colorado, more hardy, and even more beautiful than our hemlock. Among spruces we have the Colorado Menzies, and Engelmanni, and all these with the exception of concolor which have been tested thoroughly in the northwest, will compare in beauty with any of the foreign kinds, and in hardiness with any of our native kinds. A specimen of Abies Douglasii, from Colorado (Pseudotsuga of Engl.), and a specimen of A. Menziesii, of Colorado (A. Parryana, of the English, Picea pungens, of Engl.), both fifteen feet high, standing on the grounds of A. R. Whitney, Lee county, Illinois, will challenge comparison for beauty with any two conifers in America, at least as far south as Washington, D. C., and have stood there without the slightest injury for the past ten years.

The two last named species have been growing on the grounds of Prof. Sargent, Mr. Hunnewell, and many others around Boston, Massachusetts, for fifteen or sixteen years, and at Omaha and Nebraska City, Nebraska, Vineland, Kansas, Quincy and Waukegan, Illinois, and many other places in the West during the past twelve years, and are perfectly hardy wherever tested.

Another conifer from the Rocky mountains has recently been brought to notice found in Wyoming territory at Sherman on the U. P. R. R., and also in the Black Hills, in Dakota. It resembles the

Digitized by Google

white spruce in both foliage and cone, but is entirely without odor. This tree was brought to notice by Mr. J. H. Masters, of Nebraska City, who brought plants from Sherman, and has them now growing. He also procured cones of the same tree from the Black Hills. This tree is now attracting the attention of Dr. Engelmann, who will soon place it where it belongs. Pinus mitis, of Missouri, promises to endure the dry atmosphere of the West, so that it may be safely placed together with the red cedar among the conifers adapted to the West. Rev. E. Gale, of Manhattan, Kansas, and other careful cultivators, recommend these two last named, as they have found them better adapted than any other evergreens they have tested to endure the climate of Kansas.

The Colorado trees named within do not exhaust the list, for Pinus Balfouriana (aristata), Pinus flexilis, Pinus contorta, and Pinus ponderosa, are undoubtedly hardy, and I trust that our western agricultural colleges will test these and many others promising to be of value to the West, as it can hardly be expected that an individual or a single firm can spare either the time or the means to do full justice to this important subject.

PROPAGATION BY ROOT CUTTINGS.

In methods of propagation we can usually learn something from the more advanced European gardeners. The following paper from the London *Garden,* is worth preserving by western propagators, who work for the public or for the propagation of pet plants of home:

The most natural method of propagation is by means of seed; but there are many plants in cultivation which rarely produce seed, and many more which cannot be depended on to come true from seed. Moreover, we have now many hybrids, a class of plants which in all probability will be largely increased before long; as is well known true hybrids seldom seed, and those which do produce fertile seeds we often find reproducing varieties totally different from the kinds we wish to preserve. It is evident, therefore, that we must adopt other means to increase those plants, and at the same time keep their distinctive peculiarities intact. Fortunately there are many ways by which this may be done, such as by means of cuttings of the stem, grafting, budding, inarching, layering, division, and the mode which I am about to describe, by cutting of the root. Before doing so, I may mention that it is not always easy to distinguish between stem and root; many forms of

Digitized by Google

stems are often confounded with roots, such as the rhizomes of the iris, the corms of the crocus, the bulbs of the lily, the tubers of the potato, the soboles of the couch grass, etc., which are all forms of underground stems. The roots I mean to refer to are different from any of these, but inasmuch as they possess the power of forming leaf-buds, they are different from true roots, which according to botanists, have no such power; one of the main distinctions between stem and root being the absence of any provision for forming leaf-buds on the latter. They appear to be intermediate; that is, can perform the functions of both root and stem if placed in favorable circumstances. The propagation of plants by means of root cuttings has been long practiced, for I find that the late Mr. T. A. Knight, in 1816, succeeded in growing apples, pears, cherries, and plums, by putting pieces of their roo s about a foot long into the open ground. Leaf-buds are formed naturally on the roots of Pyrus japonica, Moutan peony, plums, Anemone japonica, and a few others. There are many plants which possess this power of forming buds on their roots, although they remain dormant until, either by accident or design, their roots are cut and they then push buds. It is generally supposed that the number of plants capable of being propagated in this way is very limited; but, judging from my own experience, I am inclined to think that there are many more than we are at present aware of. Having got a plant which we know will increase by means of roots, the first thing necessary to be done is to shake the soil or wash it clean away from the roots; next, cut them into little pieces, generally about half inch long; but some kinds, such as the ipecacuanha, for example, I have found to succeed when only one-sixteenth of an inch long; others require to be about one foot long. A curious fact in connection with this is, that usually no more than one bud starts, whether the pieces of root be left one-sixteenth of an inch or a foot long; all the strength goes to the bud that starts first and the others remain dormant. Having got the roots cut up, boxes or seed-pans may be prepared for them the same as for ordinary cuttings, viz.: filled with light sandy soil, adding a little peat for such plants as naturally like that kind of soil. The pieces of root should then be scattered over the surface of the pans and covered about their own depth according to the thickness of the roots used; give them a slight bottom-heat, and in a fortnight or three weeks' time, the young buds will be found rising above the soil and elbowing each other for room. Spring is the best time to put them in, although they may be inserted all through the summer months. In the case of many hardy plants bottom-heat is unnecessary, unless where time is an object, which in most cases it is. Care must be taken in hardening off plants struck in heat, as they will be found to suffer more than in the case of stem cuttings unless gradually inured to the cold. This is the whole process, and it has several advantages to recommend it. 1st. A good supply of roots may be got without at all destroying the appearance of the stock plant. 2d. The cuttings are more easily and quickly put in, and in the third place the results are more satisfactory; provided the roots are healthy, it is rare to find a piece which will not grow. The only difficulty is to learn what plants are capable of being

Digitized by Google

propagated by means of roots, and this can only be discovered by experiment, as there is nothing, so far as I can see, about the appearance of the roots themselves that would lead one to be certain whether they could be propagated in that way or not. The following plants I know, however, may be increased by means of pieces of roots. My first attempt was made with Aralia papyrifera, and then with the Aralia Japonica; I do not, however, yet know whether the new aralias, such as Veitchi, elegantissima, and others of that section, may be increased by roots or not; but most probably they may. In that case they would require to be on their own roots, and not grafted plants. All the kinds of dracænas may be propagated in this way; also hellebores, particularly H. grandiflorus or maximus. Pelargoniums thus treated will also succeed, but not so well as by stem cuttings, with the exception of fancy pelargoniums, which are often difficult to strike by means of stem cuttings. Monsonia lobata, another geraniaceous plant, Pulsatilla bracteata, a somewhat rare anemone which has fibrous roots (not a creeping rhizome like the wood anemone) may also be increased by root cuttings. Anemone Japonica (which grows naturally from the roots), clematis and ipecacuanha, may also be increased by means of root cuttings. Plants of ipecacuanha were first sent out to India in Wardian cases, but it was afterward found that the roots alone could be successfully sent out by post, and several small boxes of them were sent out that way by Prof. Balfour, along with printed instructions as to their propagation, drawn up by Mr. McNab. The roots arrived in good condition; and, on being treated as directed, abundance of plants was the result. Drosera dichotoma, a rare Australian sundew, strikes readily by means of pieces of root. Cuttings of all kinds of bouvardias are now commonly raised from roots, as are likewise Rosa rugosa and other species, and many of the hybrids, together with Senecio pulcher, Scolymus grandiflorus, Viola pedata, Cephalotus follicularis (the Australian pitcher plant), passifloras, melanthus, greyia, Xanthoceras sorbifolius, and Venus fly-trap (Dionæa muscipula). With regard to this plant it is certainly not the root that is propagated, but the bulbous enlargement formed by the old leaf-stalks, the scales of which are pulled asunder in the same way as is often done in the case of lily scales. Sarracenias and Darlingtonia Californica may also be propagated in this way, but they are clearly rhizomes, not roots, that are used for the purpose.

PERSIMMONS.

We have had much recent talk about improving our native form of this well known fruit. We have had much talk in the journals, also about the probable hardiness of the Japanese form of the *Diospyros*. Thousands of plants of the latter have been propagated and sold,

Digitized by Google

but so far as we know they have all perished the first winter in the open air on our open prairies. Yet we believe we will secure hardy varieties from northern China. We have now before us a letter from Hon. Cherber Holcombe, Secretary of the United States Legation, at Peking, China, in which he says, that delicious forms of this fruit are there grown, with fruit as large as Pippin apples, and that so far as he knows, it is the only fruit which the Chinese there propagate by grafting. So many things we have got from northern China prove hardy here that we shall not be surprised if their persimmons prove perfectly hardy. We may be very certain anyway that they will prove far hardier than those imported from the milder and moister climate of Japan. M. Naudin, in *Gardener's Chronicle,* says that the hardy species of the persimmon is the Diospyros Schi-tze which produces no seeds. The fruit is red, and in appearance much like a tomato. He says it is as different from the Japanese persimmon as are the melon and the cucumber.

SMITH GOOSEBERRY.

Thirty-five years ago the Houghton gooseberry (a native of Salem, Massachusetts) was introduced into this State. It was considered, and very justly, too, a great acquisition to our list of small fruits. It has become very generally disseminated, until it is now found in almost every garden in the central and western States. Gooseberries and currants do not succeed so well in our southern States as further north. The quality of the Houghton is quite good, the principal objection being to its small size. Thousands of the large English gooseberries have been imported from the old world, but they do not take kindly to our climate, which is so much drier and hotter than that of England. The first improvement on the Houghton in size was the "Mountain Seedling," which originated with the Shakers of Mount Lebanon, New York. This variety has had a large sale, and continues in fair demand. About the time of the dissemination of the Mountain Seedling, Charles Downing, of Newburgh, New York, originated "Downing's Seedling," which sprung from seed of the Houghton. This is probably the largest and best of all our American gooseberries; the berry is pale yellow when ripe, and of very good quality. A few years ago, Dr. Smith, of Windsor, Vermont originated "Smith's Improved Gooseberry." This plant is a strong, free grower, an abundant bearer,

Digitized by Google

and the berries attain a large size—often an inch or more in diameter. They are a pale yellow color when ripe, and of excellent flavor. This is a very profitable market and family berry.—*E. Y. Teas, in Botanical Index.*

TRAIN GRAPE VINES LOW.

A remark we find in the *Pacific Rural Press*, suggests our heading. The editor says: "The largest, sweetest, and best flavored fruit, to our taste, is to be found on vines trained about two feet from the ground and well screened by foliage from the direct rays of the sun." We do not propose to write a homily on this text. We only hope the readers of this report will try low training on our dark colored soils where the air becomes at times intensely heated between the rows. The finest Concords we have seen in the west were grown on coarse brush, keeping the vines not more than one or two feet from the earth.

MOORE'S EARLY GRAPE.

This seems likely to prove a popular grape at the west, as there seems little doubt about its ability to stand our summers and winters well. Its foliage is even better than that of the Concord. This grape was originated by Mr. Moore, of Concord, Massachusetts, and bore its first fruit in 1872, it being one of a lot of 2,500 seedlings grown by Mr. Moore. Every year since it first fruited it has been examined by the Fruit Committee of the Massachusetts Horticultural Society, and finally it received the sixty dollars prize for the most promising seedling grape. With this careful and conservative old Society this may be considered high commendation. The fruit is larger than Concord, and beyond doubt it matures earlier. In quality it does not seem to vary much from Concords ripened under proper conditions. The earliness and undoubted hardiness of this variety will commend it to the notice of those anxious to try the most promising novelties. It will soon be sold at very reasonable rates.

Digitized by Google

BLACKHAW—CAN IT BE IMPROVED?

Mr. L. B. Case, in the *Botanical Index*, thus speaks of one of our finest native shrubs or small trees:

A few years ago we transplanted a fine, thrifty young specimen of the Blackhaw from a swampy or peaty thicket to a dry corner of our garden, where it has even more than fulfilled our expectations as an ornamental shrub, as well as bearing a desirable fruit. In all our botanies its habitat is given as "woods or dry copses" (sparsely wooded fields), but the finest specimens of the fruit we ever saw were those found in swampy thickets and hedges, or near streams of running water; however, it is quite doubtful whether the locality of the shrub makes any material difference with the fruit—probably we accidently found finer examples of fruit in these places. But be that as it may, it illustrates its capability of adapting itself to a dry or moist situation as occasion may require, which is of the utmost importance in cultivation. There can be no reasonable doubt of its susceptibility of improvement under cultivation, as well as in the hands of professional hybridzers or skillful nurserymen, and we hope to see the experiment made and to learn of the results.

But it must be borne in mind that nearly all our choice varieties of table fruit bear little resemblance to the original or typical species from which they originated, and the change has been usually produced by carefully selecting the finest examples of wild fruit, to improve either by cultivation or hybridizing, and again to select only from the most perfect cultivated fruit for still further improving. This is a subject the importance of which cannot well be be overestimated, and we particularly wish to impress upon our fruit-growing friends the fact that they have within their reach the foundation of a fruit new to economic and commercial values, but which we think is destined at some future day to form a very important addition to our desirable fruits.

Another very important consideration in connection with this fruit is its extreme hardiness, differing in this respect from most of our cultivated fruits by not being so liable to suffer from our occasional severe winters. Add to this their quality as producing a desirable fruit the fact that they are a very desirable ornamental lawn shrub, both in spring when in flower, and in fall when they are clothed with their bronzy foliage.

Digitized by Google

CARAGANA FOR HEDGING.

A small tree of *Caragana arborescens* growing in an exposed position on the College ground, gives all the required evidences of capacity to endure the extremes of our climate. Some of the shrubby and extremely thorny species, growing on the plains of Siberia, and on the barren hills west of Peking are likely in the future to prove valuable hedge plants for our open northern prairies. Letters received from Peking, China, say that the branches of *Caragana spinosa* are used on the top of walls to prevent persons from climbing them. Grown on our soils it would not be apt to attain a greater height than from four to six feet. Beyond a shadow of doubt this species will prove as hardy as willow. It is said to be easily propagated from seeds or cuttings.

BARBERRY AS A TREE.

This plant is found in most neighborhoods of the State as shrubs with numerous side suckers. In this shape it is far from elegant, and is little inclined to produce fruit. When pruned up and the suckers kept down, it forms a fine symmetrical head, with drooping branches. These beautiful little trees will be loaded each spring with yellow blossoms and with clusters of its bright scarlet fruit in autumn. It is as much improved by this plan of training as is the snowball or lilac. If properly managed, we know of no tree more suitable for small lawns than the barberry Canadensis.

In connection, we may add, that the shepherdia (Buffalo berry) is also a beautiful small tree for the yard, if trained as a small tree, rather than a straggling *bush.*

CHINESE SAND PEAR AND ITS SEEDLINGS.

The origin of *the Le Conte pear* is somewhat in obscurity. It is said to have been sent from a New York nursery, some thirty years since, by Major Le Conte, of Philadelphia, to some relative or friend of his in Liberty county, Georgia, labeled "Chinese Sand pear," but it

Digitized by Google

is quite distinct from that variety, and is no doubt a hybrid between it and some garden pear, and has only been known to the public during the past few years. Mr. H. H. Sanford, of Thomasville, Georgia, kindly sent me specimens of this variety the last week of July 1877 and 1878, being then ready for market. They were of good flavor, good size ovate, pyriform in shape, and of a pale yellow, or a delicate greenish white color, flesh white with a peculiar flavor, being a mixture of the saccharine and vinous, having a slight astringency which may have been caused by not being fully ripe; they were not however equal in quality to many of our best garden varieties. Mr. Sanford informed me that the trees were hardy, very vigorous, early and very abundant bearers, and the fruit commands a high price in the market; the foliage is large and glossy, which gives the tree a handsome appearance.

From the different reports the Le Conte has succeeded remarkably well in the South, being suited to the climate, hardy, free from blight, a very prolific bearer and profitable. It has not fruited sufficiently at the North, to my knowledge, to give an opinion of its merits or value. The *Chinese Sand pear* and the *Japan pear* (the latter originating in New Jersey from seed brought from Japan) are hardy and free-growing trees in this locality; they bear early, and very abundantly, medium size and handsome fruit, not eatable out of hand, but make a good sauce, and also good for canning; the fruit will keep till midwinter or longer, with care; the foliage, especially of the Japan variety, is very large, glossy, and will make a beautiful lawn tree, and so far is free from the blight of our cultivated pears, and if it continues, will be an acquisition, that is, if the seedlings or hybrids will produce varieties equal to our best garden sorts. *Keiffer's hybrid* is another seedling of the Chinese Sand pear, which originated in the garden of Mr. Peter Keiffer, near Philadelphia, and which tree was growing near Beurre d' Anjou, Bartlett, Duchesse, etc., the product being Keiffer's hybrid, which is of very good quality, good size, deep yellow color, and orange yellow where exposed to the sun, ripening in October, and from what I have seen of it, it is a promising variety for market, as well as for family use.—*Charles Downing, in New York Tribune.*

Digitized by Google

LEACHED ASHES.

Josiah Hoopes, in the *New York Tribune*, reports that the cracking of pears in its worst form has been cured by incorporating in the soil a liberal supply of wood ashes. Much experience and observation have convinced us that our prairie farmers should more carefully utilize all obtainable supply of leached or unleached ashes in their vicinity for use in the orchard, the vineyard, the strawberry plats, etc. In all cases we have noted the size, perfection, and even flavor of the fruits have been improved by the application of ashes.

GRAPE ROT.

W. B. Bateham, of Ohio, one of our most careful horticultural writers, has given the opinion that grape rot is caused by damp weather and a consequent plethora of sap. The watery portions of the sap cannot escape by evaporation in damp weather, hence fungus growths, rot, mildew, etc. This view is strengthened by the fact that on our dry interior prairies the grape rot is hardly known, except during the unfrequent seasons when we have two or three weeks of rainy or damp weather just preceding the season of maturity of fruit.

WINTER ST. LAWRENCE.

Of this Canadian apple, T. H. Hoskins, of Vermont, reports as follows:

It has appeared at the fruit shows of the Montreal Horticultural Society and elsewhere in the Province in increasing quantity for a number of years, and during the present season frequently with the name of "Maux Codlin" affixed to it. Good judges, however, declare it not to be the true apple of that name. From inquiry and observation in orchards where this apple is grown, I find it increasing in consideration as a very good fruit both for home use and market. Its keeping quality is not definitely ascertained, but it is probably good. Size of fruit medium to large. Tree hardy, a good grower

Digitized by Google

and productive. This variety is more conical than the fall apple known as St. Lawrence. It also has finer striping, somewhat duller color, and greater regularity of form. It has many of the characteristics of a profitable market fruit.

ROOT AND TOP-GRAFTING.

BY PROF. JAMES MATHEWS, KNOXVILLE.

NOTE—This paper, written several years since, is given at this time to show that the present wide-spread interest in the subject of top-grafting is not altogether the result of recent experience.

EDITOR WESTERN HORTICULTURIST—*Dear Sir*—I believe there is at this time no diversity of opinion among pomologists in regard to the alleged fact, that many varieties of fruits are greatly affected in size, flavor, appearance, fruitfulness, and even hardiness, by being planted and grown in different soils, localities and climates. That trees of many sorts and varieties may grow healthfully and vigorously, and be perfectly hardy in California, which will kill out by the far more rigorous winters of Iowa or Wisconsin, all fruit-growers recognize as an established fact. Whether the physiological reasons for these things are well settled and understood, I will not, nor need I, now undertake to say.

But it is my present intention to introduce another subject in regard to which, while it is of the deepest concern to all fruit culturists, there is not a concurrence of public opinion. This being so, I introduce the topic without apology, with my own experience, observations and conclusions, together with the testimony of other fruit-growers of undoubted experience, for the purpose of eliciting the opinions of others on the question involved. I hope every fruit-grower, especially in the West, will freely communicate all the facts and experiences he may have had, which are germane to the subject.

The proposition, or problem, is, are certain varieties of fruits more hardy and prolific, and of superior size, beauty and flavor, when top-worked, that is, budded or grafted (the stock being hardy) two to five feet above the ground?

As I am aware that this is a controverted point, I will submit a statement of a few of the facts upon which I maintain the affirmative, for the consideration of those whose opinions are adverse to mine, as well as for those who have formed no definite conclusions in the matter of controversy. I shall give names and localities, so that if any desire to institute further investigations, they will have a fair opportunity of doing so.

On the first of April, 1872, I spent most of the day in the orchard of Mr.

Digitized by Google

Drury Overton, one mile and a-half from Knoxville, Iowa. This orchard contains from fifteen hundred to two thousand trees, most of which were planted twenty-three and twenty-four years ago, consequently passed the terrible winters of 1855 and 1856, and 1856 and 1857. Mr. Overton is an old nurseryman, having commenced the business in Henry county, Iowa, about thirty years ago; has been engaged in nursery and fruit-growing ever since; is a modest and rather reticent man, but one of the closest observers in the State. In planting this orchard it so happened that almost every variety set out was divided between root and top grafts, hence affording a very favorable opportunity of testing the advantages and disadvantages of the two modes of grafting. On the occasion stated, Mr. Overton accompaned me, and my subsequent remarks in quotations are substantially, and as nearly as possible, in his own words, and taken down in pencil by me as we passed and were observing each variety.

White Winter Pearmain—"Does twice as well top-grafted as on root graft." Says, "This kind wants to be top-worked about five feet from the ground." Says also, that "the fruit scabs badly, even grown in this way."

Early Pennock—"Far better, and perfectly hardy when top-worked." I will remark that this kind on my grounds root-grafted, is only half hardy, and a poor bearer. What specimens there are, however, are very fine.

Hubbardson's Nonsuch—"Splendid when top-worked, and perfectly hardy, but tender and indifferent when root-grafted."

Dyer—"A good bearer when top-worked; poor bearer when root-grafted. Hardy both ways."

American Golden Russet—"Killed in 1855, '56, even top-worked" (thermometer 32 below zero), "but has not been hurt since. Perfectly tender, root-grafted."

Roxbury Russet—"Does very well top-worked, but will not succeed root-grafted."

Fulton—"Only bears well when top-worked, but is hardy either way."

Swaar—"*First rate*, and good bearer when top-worked, but only succeeds in this way."

Esopus Spitzenburgh—"*First rate*, perfectly hardy, and bears well when top-worked, but will not succeed root-grafted."

These trees (two of them) have been planted out twenty-four years; stood the ordeal of 1855, '56, and 1856,' 57, and now there are no sounder trees in the neighborhood. I tried this kind several years root-grafted, and after my best efforts entirely failed in bringing a single specimen to bearing size, but have known one or two instances where the fruit has been produced on root-grafted trees in clay soil.

Porter—"Fine, but only when top-worked."

American Summer Pearmain—"Perfectly hardy when top-worked, but does not bear satisfactorily even then."

Little Red Romanite (Gilpin)—"Hardy, and a great bearer when top-worked; not hardy root-grafted."

Winesap—"Far better and more prolific when top-worked."

Digitized by Google

Michael Henry Pippin—"Good only when top-worked."

Fall Pippin—"Fine and hardy top-worked." This variety with me (root-grafted) is only half hardy.

Jonathan—"Far better top-worked, standing side by side."

Tulpehocken—"Fine and quite hardy top-worked." In my grounds, root-grafted, this kind can only be considered half hardy, and is variable in quality.

Wagener—"First rate, and *don't blight* when top-budded." In my grounds this kind, root-grafted, is the worst *top-blighter* I have.

In the hard winters previously alluded to (1855–6–7) Mr. Overton's trees of Rambo, root-grafted (about one hundred), were all killed to the ground, while in Mr. John Gamble's orchard, about one-quarter of a mile distant, there were two trees of this kind, top-grafted, planted out in 1851, twenty-two years ago, which were uninjured, are now perfectly sound and bear plentifully.

I will state here, that in Mr. Gamble's orchard are four trees of what he calls "Early Sheep's Nose," which is a very fine apple and great bearer, ripening in August; perfectly hardy top-worked, but tender and worthless root-grafted. This kind came from a nursery in Henry county, Iowa, twenty-two years ago. I cannot make it out to be identical with any other known variety, though it probably is. Can some one give information about it? Being a constant bearer, it is a very profitable summer fruit.

To close this communication, already too long, I will say that I have in my grounds at Knoxville, several trees of Williams' Favorite, four of which are top-grafted four feet or upward from the ground; have been in bearing about ten years, and have never failed to produce a good crop annually, ripening gradually from fifteenth of August to about the last of September. They are among the best, and by far the most profitable summer apple I have; while I have three others, root-grafted, and five of such will not, in proportion to age and size, produce as much as one of the top-grafted trees. I will add further, that from an experience with this kind of ten years' fruiting, it is, for all qualities, without a rival as a summer fruit.

CANADA LATE STRAWBERRY.

ABBOTTSFORD, CANADA.

PROF. J. L. BUDD—*Dear Sir*—I herewith send you scions of our Late strawberry (wrongly so called). We have been in doubt about this variety, and now our doubts are settled definitely. Mr. Downing does not know this fruit, nor do we know its history, but believe we will trace it to New England. It is of the Late strawberry type, not equal in flavor but much larger and more showy. It begins to ripen the last of August, and ripens odd specimens until October. If the crop left be then barreled it will keep until Jan-

Digitized by Google

uary 15th. The tree is a slow grower and makes a poor nursery tree. In orchard it forms a round, thick, bushy head, needing a great deal of small pruning. It is not as long lived with us as the Famuese, yet bears so young, so regularly and heavily, that our association has placed it upon the list as one of "the five best for profit." We would have sent scions to you two years ago but we then thought it was your Late strawberry.

Yours respectfully,

CHARLES GIBB.

WOLF RIVER AND ALEXANDER.

At the recent meeting of the Wisconsin State Horticultural Society a fruit committee decided that these two varieties were synonymous. Not believing this possible, letters of inquiry were addressed to those who have grown both varieties. We append extracts from two of the replies received.

Mr. C. G. Patten, of Charles City writes as follows:

Cannot see how anyone who has grown Wolf River and Alexander, who is at all observing, could call them the same. Wolf River has a lighter colored bark, more speckled, and is a much better grower; buds on new growth have a peculiar reddish cast, very different from those of Alexander, which are drab or grayish in color. The tree of Wolf River is more spreading in growth, and the fruit is two months later in season. Mr. Gaylord grew the latter the past season nearly as dark in color as any Baldwin.

Mr. J. C. Plumb, of Milton, Wisconsin, writes as follows:

Our committee on fruits have made a blunder in calling Wolf River (sent us by friend Springer) Alexander. I will set the matter right in our next report.

CROSSING FRUITS.

DES MOINES, Feb. 3, 1880.

PROF. J. L. BUDD—*My Dear Sir*—I have been thinking over the subject of crossing the tender varieties of our choicest fruits with the iron-clad sorts for a long time, but owing to my premises being entirely devoted to orchard I have no place to plant for experimental work. I have more recently thought that a degree of success might attend the grafting of known hardy sorts in the tops of bearing trees of choicer sorts less hardy in tree. In this way it

Digitized by Google

will be easy to pollenize the blossoms of the hardy sorts more or less perfectly, without trying the difficult job of artificial impregnation. I have a cherry tree which I have grafted with a view to secure from the seeds something more valuable than the Richmond. I am aware this method will not be according to the books, but it is the next best thing, as I have failed in all my efforts at artificial cross-fertilization. The goal of my ambition, in the apple line, is to secure a late keeper as good in quality as the Roman Stem, and as handsome as the Duchess, and, with all this, as hardy as the latter. I have over one hundred varieties of the apple in bearing, including all the choice old varieties, and it would seem that with such surroundings our hope of securing a cross embodying the requisites above stated would be more likely to be realized than at the north, where the list of choice varieties is more restricted.

In view of this I would like to secure some of the north of Europe varieties for top-working.

Yours truly,

J. C. SMITH.

CUCUMBERS ON TRELLISES.

The *Gardener's Monthly* says no one who has not tried it, can have any idea of the luxurious growth of a cucumber, when trained on a stake, which has a set of stubby side branches left along its length; and a crop on some the writer saw so trained was enormous. By this plan the vines occupy less ground, and it is the natural habit of the cucumber to climb instead of trailing on the ground. This is a hint worth remembering, especially by those who have small gardens.

KYANIZING PLANT LABELS.

A German paper gives the following method for making soft wood labels used in flower pots, for plants in gardens, etc., very durable. The process has been tried in this country with results that seem promising:

Soak the labels in a strong solution of copperas (sulphate of iron), then lay them, after they are dry, in lime water. This causes the formation of sulphate of lime (gypsum) in the wood. Bass mats, twine, and other material used in tying up or covering plants, treated in this way, also become very durable.

Digitized by Google

SYNONYMS OF FRUIT IN EUROPE.

In our search for the best fruits of Northern Europe and Asia, we have realized the want of organized Horticultural Societies, such as we have in this country. It is so in Southern Europe. We are told the May Duke cherry has sixty-two distinct names, Hortense has thirty-two; some of the older pears fifty to sixty-eight. Hamburg grapes, fifty-five, etc.

THE HARDY CATALPA ON THE LAWN.

We have very much talk recently about the value of the catalpa as a timber tree, but we see very little said about its desirability as a lawn tree. Some notes written by Samuel Parsons, of New York, for the *Country Gentleman*, will apply exactly to the planting of this tree extensively in yards, ornamental grounds, and in cemeteries:

It is hardly the best of street trees, being too low, broad-headed, etc., but on the lawn we cannot overlook its value. Its good qualities are numerous. The broad, rounded contour of the foliage is very firm, the growth of stem and branches picturesque and attractive, and the leaves are large and of decided outline, with a beautiful bright green peculiar to themselves. This bright green color doubtless comes out most beautifully on the young growth, although it is always fine, especially in autumn. The late fall freshness and brightness of catalpa foliage is a quality not to be lost sight of in composing a landscape where variety of pleasing effects throughout the season is desirable. It is likewise to be noted that the richest tints appear on the young leaves, whether developed by the first or second growth. Hence arises, also, the beautiful golden variety where broad, rich masses of greenish yellow develop, especially in June and September. All these characteristics of rounded contour and large, bright green leaves combine to lend the catalpa a certain oriental aspect, possessed in higher degree by scarcely any other tree unless it be *Magnolia macrophylla.*

Objection has been made to the irregular character of the growth of the catalpa, but it is also very vigorous and recuperative, and should, therefore, be systematically and severely pruned. Only thus can it be prevented from lapsing into more or less early disfigurement. Unquestionably long-lived in a general way, its beauty soon disappears unless thus restrained by pruning. Here again we have a case where retention of lower branches becomes very important, for the growth of the catalpa trunk is often specially ugly. The

Digitized by Google

true place to use the catalpa on the lawn is on some steep declivity or hillside, where the eye rests at once on the soft and rounded outlines and tender, golden green of its foliage. It grows, moreover, on any soil, and is, therefore, all the better suited for barren hillsides. I have often wondered why parks do not employ the catalpa in masses, or territories by themselves, as large features in the landscape. Natural arbors or groves might be thus formed of the most pleasing and effective character.

THOMAS MEEHAN'S VIEWS ON THE SHADING OF ORCHARD SOILS.

In connection with the much that has been said in our reports on the subject of keeping the surface soil of orchards and small fruit plantations shaded and cool by the sowing of buckwheat and clover, we wish to present the views of one of the closest observers of our country. In an editorial published in 1874, Thomas Meehan says:

For our part we have never undertaken any crusade against science. On the contrary, we believe we have done as much to encourage a love of science among the cultivators of the soil as any one. But we have never hesitated to abandon the most cherished theories of distinguished horticultural scientists, whenever experience and observation have taught us they were wrong; and not only abandoned them, but have always felt it our duty to lay all the facts before our readers regardless of any abuse that might follow, feeling as old Cobbett used to teach, that a grain of experience and observation is worth a whole ton of theories, however ingeniously constructed.

The season is now approaching when we want our readers to test an old theory as thoroughly as we have done. They will at least learn something by the experiment. One of the old and cherished theories of fruit culturists is that trees will not do well without a constantly *clean surface soil.*

It is conceded that trees will not thrive well when the temperature of the earth in the open ground is much above seventy degrees. At eighty degrees the system of the tree becomes weak and renders the leaves susceptible to the attacks of various fungi and other diseases. And yet the experimenter will find, in this region at least, that soil unprotected on the surface from the sun's rays will go over ninety or one hundred degrees. It is very likely after this he will get tired of seeing the leaves of his pear trees fall off before midsummer has hardly gone, and go to protecting the surface in some way, yet believing probably that in "theory," at least, the exposed, clean, sun-roasted surface is the proper way, and the only right way to grow trees.

Digitized by Google

He may live in a region where year after year young seedling pears drop their leaves so early in the season that it is impossible to bud them; and he may have to abandon the business to northern men who "can grow pears."

He may take a dozen or so of these seedlings and pack them thoroughly through and about with brushwood, so that it is almost a struggle for the plant to push its way through. He will find the leaves green and healthy to the last, while those on the clean soil will long since have lost theirs; and on testing the land under the brush with a thermometer, he will find it about twenty degrees lower than in the other case. He may think after this that it will pay him to keep his soil cool in some way, though he may not still dare to dispute the theories of those who hold that a clean surface is the beginning and end of all good culture.

Let every one take his thermometer and try the difference between the shaded ground and the clean surface, and the difference in the health of trees in connection with the earth temperature, and he will be surprised how much he will learn.

FOOD OF GARDEN MOLE.

On account of the difference of opinion of scientists as to whether the mole is a friend or an enemy to the flower and vegetable garden, the following experiment of Prof. W. J. Beal, of the Michigan Agricultural College, may be useful:

On July 13, 1877, a large flower pot was set below the run of a mole, and covered lightly with boards and earth. This was not examined until July 16th. The mole was there in some soil which he had crowded into the pot. He was placed in a nail keg large enough to hold one hundred pounds of nails, one head of which was out. Two or three inches of sand were placed in the bottom, and a board covered the top quite tight. This was set in the barn at night and six kernels of sweet corn were dropped in. The corn was old, but had been partially cooked and somewhat softened. On July 17, at 8 A. M., the soil was carefully looked over and the corn was gone. Twelve kernels more of corn were put in and the keg moved near the kitchen door to be certain that the mice did not eat the corn. At noon of the same day eight kernels of the corn had disappeared, and before night all were gone. On July 18, at noon, twelve more kernels were thrown in, also a small new potato, about an inch in diameter, cut through the middle. On the 19th, at 10 A. M., two whole and one half kernels of corn were found; the potato was untouched. The keg was kept closely covered. Six red pie cherries were now put in, and at 5 P. M., one piece of the potato was found much gnawed, while the whole of the cherries, except two pits, had disappeared. There was no corn except a part of a kernel.

Digitized by Google

The mole was let out after being kept in the keg on the above mentioned food from noon of July 16, till the evening of July 19. He was lively and began to disappear in the ground when he was killed. No examination was made of his stomach.

INFLUENCE OF STOCK ON GRAFT.

Geo. W. Campbell, of Ohio, gives the following examples, which may have some bearing on the question as discussed in our State:

A curious and very conclusive instance, showing the effect of the graft upon the stock, occurred in one of my green-houses the present season. Last December my gardener selected a stock of Abutilon Boule de Neige, a well known variety with white flowers, and green leaves, which have never shown any signs of variegation, and after trimming off the side branches, inserted a graft at the height of four feet of Aubutilon Mesopotamicum variegatum. This latter variety is of trailing, or weeping habit, and its foliage intensely variegated with different shades of mottled green and yellow. The graft grew, and retains all its peculiarities of growth and variegation; the stock has also put forth new side-shoots all along its length of four feet below the graft, and nearly all the leaves growing on these shoots from the Boule de Neige stock are marked with clear and distinct variegations of golden yellow, which can only be attributed to the influence of the graft above.

Upon the other side of the question I will also give an instance of my experience. Two roses were growing near each other; one a variety with very dark crimson, but not well formed, flowers. The other a light blush rose, finely formed, but of a light, undecided color. From the latter variety I inserted buds into the growing shoots of the first named, with this result: The buds grew and retained all their habits of growth and foliage, as well as the form of the flowers; but the color, instead of the light, uncertain blush, was of a rich, dark crimson; nearly, but not quite as dark as the bloom of the stock upon which it was budded.

YELLOW TRANSPARENT APPLE.

This variety is one imported from St. Petersburg, in 1870, by the Department of Agriculture. It has been fruited at a number of points east and west, and we have every reason to believe it will prove a

Digitized by Google

valuable acquisition as a very early variety, of good quality, for either eating or cooking. Both top-worked and root-grafted, on the College Farm, it ripens up in autumn like a crab. Dr. Hoskins, of Newport, Vermont, makes the following report:

It is an extremely early bearer, giving fruit the third year from grafting on a seedling root, and is now bearing its third crop, consisting of over one bushel. The tree, notwithstanding its productiveness, is a free grower, being now some eight feet high. It is also an erect grower, and bears its fruit on short spurs close to the main branches, so that it can carry a heavy crop when the tree is small without breaking down. Though so full of fruit that there seem to be more apples than leaves, yet the branches are not bent down at all.

In size the Yellow Transparent is full medium, round ovate in form, straw yellow in color, with an extremely melting, juicy flesh of delicate sub-acid, but not very high flavor. It is fair, uniform in size, and its chief merit, in our eyes, aside from its perfect hardiness, and early and abundant bearing, is that it is the earliest dessert apple we know. It begins to come into eating by the first of August, and the bulk of the crop is just now (August 10) ripening up. It will not keep long, soon becoming mealy and cracking open at full maturity. But for a home apple, or to sell direct to consumers in a near market, it cannot be surpassed; and its waxen beauty and fairness, together with its acceptable flavor, will make it a favorite wherever grown. It is about two weeks earlier than Tetofsky, and if it had been introduced first we doubt if the latter would ever have been heard of.

EFFECTS OF CULTIVATION.

Dr. Goessman, of the Massachusetts Agricultural College, has had the ash of the Wilder strawberry analyzed in his laboratory. The results, as published in *The Massachusetts Ploughman*, are given in the following table, side by side with the composition of the ash of the wild strawberry:

	WILDER.	WILD.
Potash	49.24	22.06
Soda	3.23	29.79
Lime	13.47	14.88
Magnesia	8.12	Trace.
Ferrio oxide	1.74	6.07
Phosphoric acid	18.50	14.47
Silicia	5.66	12.62

Digitized by Google

The extent to which potash has displaced the soda in the cultivated variety is very interesting. Such substitution is not unusual when a plant is taken from its wild condition and put under cultivation. The ash of the wild asparagus contains 18.77 per cent of potash and 16.33 of soda, while the ash of the full grown garden plant may contain 51.71 per cent of potash and no soda; the young sprouts contain from 23 to 28 per cent of potash, and 4 to 6.5 of soda.

That, in the case of fruits, this substitution of one ash-ingredient for another has something to do with the improved character of the fruit is indicated by results obtained by Dr. Goessman, in manuring grapes with potash and phosphate; he succeeded by a liberal application of these fertilizers in changing the proportions of potash and sugar from those natural to the wild grape to those of a good Concord grape. The wild strawberry differs from the cultivated fruit in a similar manner; it contains a smaller proportion of sugar as well as of potash. Similar wide differences have been found in the composition of larger fruits. An analysis made in 1848, of the ash of the apple gave 35.65 per cent of potash and 29.69 of soda; an analysis by Atwater, of the ash of the Rhode Island Greening, gave of potash 53.42 per cent, and 0.58 of soda. Some hints may be derived from these facts as to the direction in which it may be profitable to experiment with concentrated manures in fruit culture.

TOP-GRAFTING THE GOOSEBERRY.

In answer to query of a correspondent, Thomas Meehan, in the *Gardener's Monthly*, gives the following:

Ribes Aureum is the common yellow Missouri currant; and Ribes Floridum is the wild native black currant of the Eastern States. They are used for stocks because the roots are more suited to our hot summer ground than the foreign varieties are. It is this heated ground which induces mildew in the large English gooseberries, and when they are on these stocks they are free from mildew.

Digitized by Google

TWO NEW RUSSIAN APPLES.

The following notes from the columns edited by Dr. Hoskins, of Newport Vermont, should have an interest to settlers on our northern prairies:

ST. PETER APPLE.

Among the new varieties of Russian apples, the scions of which were imported and distributed by the Department of Agriculture in 1869, we have one which is bearing for the first time, but quite freely, the present season. It is called "St. Peter," a name that led us to expect something very large and fine. But in fact it proves a little apple, averaging about six or seven inches in circumference. In appearance it very closely resembles the "Early Joe," though somewhat less flattened, and not so deep a red in the sun. The following technical description, when compared with that of Early Joe in the books, will show their close resemblance as to fruit, even in minute particulars. Size medium or rather small; roundish oblate, sometimes approaching conical; smooth and regular; color, with numerous short broken red stripes on a yellow ground, a nearly uniform bright red in the sun, dotted with fine white specs; stem from an inch to an inch and a-half long, rather slim; cavity shallow, acute; basin small and regularly corrugated or plaited; calyx closed; flesh white, fine grained, very tender, slightly crisp, juicy, subacid, spicy; quality very good. Ripens (in northern Vermont) the last two weeks in August. Tree, when young, an upright, slim, free grower; shoots reddish brown, with a few inconspicuous white dots; leaves of medium size (small for a Russian) waved, finely crenate.

Though the fruit is so much like Early Joe, the tree is very distinct. As to the quality of the fruit, while we cannot rank it with the Early Joe, as "best," it fully deserves to be called "very good," and decidedly "best" for a Russian—no apple of that class within our knowledge being entitled to rank with the "best" of American dessert apples. But when we consider that the St. Peter is entirely hardy, or "iron-clad," in the coldest section of New England, where Early Joe is grown only with difficulty in favored localities, and not by any means in perfection, we may consider the St. Peter as quite an acquisition to our list of nice, early dessert fruit.

THE GRAND SULTAN APPLE.

This large, early and beautiful apple (one of the new Russians) has fruited freely with us the present season, and fully sustains the high opinion we got of it from the few samples obtained from the tree in previous years. Like many of the Russians it bears very young and very profusely. It is of about the same season as the Yellow Transparent (our description of which, last year, was copied in hundreds of papers, all over the Northern

Digitized by Google

States and Canada), being about gone by the 20th of August, or near the time when Tetofsky and Red Astrachan begin to come into eating. In quality and size it is superior to the Yellow Transparent, and bears its fruit quite differently, all over the tree, and near the ends of the branches, instead of upon short spurs on the larger limbs. In color it is greenish white, changing to a pale translucent yellow at maturity. It is a very soft, mellow apple, with a decided and agreeable sub-acid flavor, and some aroma. In size it exceeds a well-grown Porter apple, is similar to the Porter in shape, but less conical. It hangs well to the tree, and ripens in succession from August 1st to August 20th. The tree is thrifty, but not so strong a grower as Yellow Transparent.

McINTOSH RED APPLE.

John Croil, of Aulsville, Canada, thus talks of this apple already introduced in our State:

The parent tree originated where it now stands, in Matilda, Dundas county, Ontario, some seventy years ago, and it has borne every year since the oldest inhabitant can remember, and is still perfectly hardy, the apples also being good in every respect. It has been propagated from, and distributed in the neighborhood, and evidence is given of the most positive character as to the hardiness, productiveness, and longevity of the tree, and the quality, size and keeping properties of the apple. I have not had this variety long enough to speak positively of its bearing qualities, but the few apples I have had are equal to the description, and my trees are healthy and hardy. I planted, in faith, sixty trees last spring, and ten some years ago.

Downing gives the season of this as ranging from November to February.

THE WILSON STRAWBERRY—ITS HISTORY.

D. W. Beadle gives some notes in the *Canadian Horticulturist*, relative to the "rise and progress" of this widely known variety, from which we may learn the valuable lesson that true merit in a fruit will finally win:

It is now a little more than twenty-five years ago that the late James Wilson, a nurseryman of Albany, New York, raised several seedling strawberry

Digitized by Google

plants from seed of the Ross Phœnix, Hovey, and Black Prince. Of these seedlings only one gave promise of being valuable. In the summer of 1853 he exhibited some of the plants in bearing at the exhibition of the Albany Horticultural Society. His failure to excite any interest did not prevent him from bringing it forward again the following summer. He now showed in pots, the plants laden with fruit, and such was the size and number of berries upon each plant that people were astonished. In 1856, John Sloan, of Albany, fruited 300 Wilson plants and found them to be "more profitable than Early Scarlet or Crimson Cone." In October, 1857, John Wilson, a son of the originator, sent some plants to J. Jay Smith, then editor of the *Horticulturist*. In 1858, H. H. Mish, of Harrisburg, Penn., reported that he had received some Wilson plants during the previous autumn, and that it promised to be productive and valuable. At the meeting of the Fruit Growers' Society of New York, in 1858, Burr's new pine and early scarlet, received each seven votes for amateur culture, and Wilson's Albany and Hovey received each four votes. For market, early scarlet received eight votes, crimson cone and Wilson each seven, Hovey four, Burr's new pine two.

The same year the American Pomological Society added the Wilson to their list. It thus became recognized in five years after its first exhibit at Albany. Passing now over a dozen years, we find, in 1871, the American Pomological Society has its representatives from fifty States and Provinces, and that the Wilson has found its way into twenty-six of them, in all of which it is recommended, and in fourteen of them it is *double starred*, to denote superiority. Meanwhile, where are the varieties which stood in the front rank when Mr. Wilson first exhibited his new plant at Albany? Only four of them, Boston pine, Hovey, early scarlet and Victoria, can be found at all in this report. Of those which had since attained a position in the Society's list, the Triumph de Gand stands next to Wilson, and this is double starred in only six States. Again, passing, we find in the American Pomological Report of 1877, with thirty varieties now on the list, Wilson is still in advance. In thirty-six (36) of the States and Territories represented it is now double starred. These points, where it attained this great excellence, extend from 28 degrees to 49 degrees north latitude, and from the Atlantic to the Pacific. Triumph de Gand still holds next rank, being double starred in six States, and recommended in twenty-four. The verdict of the public is in favor of the Wilson; it has stood the test of time and of great variety of soil and climate, and we may as well accept that verdict, for it is doubtless correct. We have here a lesson too for "Committees on New Fruits."

McAvoy's Superior, to which was awarded the prize of $100, in 1851, in twenty years had entirely disappeared from the list of the Pomological Society, while the Wilson has spread over half the continent.

Digitized by Google

DUCHESS OF OLDENBURG APPLE.

We follow the above notices of the Wilson strawberry with some notes on this fruit, the object being to show that where any fruit has the right leaf and cell structure for enduring wide extremes of climate, it may yet succeed perfectly where the conditions are more equal.

In the even moist climate of England, Dr. Hogg reports it large, even-sized, beautiful fruit, with yellowish white flesh; firm, crisp, and very juicy, with a pleasant refreshing flavor. The tree is hardy, a free grower, and an excellent bearer.

In Canada, in all parts from which we have reports, it is a wonder in the way of bearing great crops of uniform and beautiful fruit.

In Minnesota it is also a model as a perfect tree, always coming to time with its crop of perfect fruit.

In Mississippi, and even in Florida, it is less perfect in fruit but a general favorite.

LE CONTE PEAR.

Mr. L. L. Varnadoe, of Thomasville, Georgia, writes to the Florida *Agriculturist* that his trees of the Le Conte pear, on the fifteenth of December, 1879, were full of pears *of the second crop of the season.* What shall we conclude from this statement? The Le Conte is supposed to be hardy at the north, and to be a seedling of the Chinese Sand pear. Has the tree lost its reckoning in its growth in a clime knowing little of winter frosts?

In sending some scions of this pear, for trial at the experimental station of the Agricultural College, Mr. Varnadoe wrote, "I send the scions in suitable lengths for cuttings. You will find this pear to grow readily from cuttings. My trees grown from cuttings are now eight feet, the growth of the past season."

Surely this pear has some remarkable peculiarities. It will be surprising if it proves hardy here. We will soon know.

Digitized by Google

PEAR BLIGHT.

"I intimated recently," writes a correspondent of the *Country Gentleman*, "that I had made some observations that might possibly throw light upon the cause of pear blight, from which a remedy might peradventure be deduced. I have a tree that stands near my house which receives the sunshine only three hours a day in the summer time. The bearing wood is mostly above the eaves, and gets the sun eight or ten hours a day. The body of the tree is of uniform growth and size, and inclosed in a finely reticulated bark. It has the healthiest kind of an appearance, seeming to be entirely blight-proof. A Buffum, very much, though perhaps not quite as well shaded, exhibits about the same characteristics. A third, shaded like the first above described, is apparently as healthy, but is not so old a tree. I had many pear trees in my garden a few years ago, but the most of them yielded to the disease, and I have planted none since. The Seckel bore the attacks best, and a considerable number of the first put out are standing and healthy. If any conclusion can be drawn from this experience, it is that excessive heat has something to do with the trouble. And if that proves true to any extent, then the remedy is to be found in some means for protecting the bodies of our trees against its effects."

ENGLISH ALDER.

WYOMING, IOWA.

PROF. BUDD—Yours at hand. The plants you ask about, supposed to be English alder, were sent me when one year old seedlings by Wm. Hill, of Dundee, Illinois. Mr. Hill was formerly a nurseryman in Scotland, and one of our straight, honest Scotchmen. Hon. John Tasker, one of my neighbors, formerly worked with Hill in his Scotland nursery. They are my authority for calling the tree English alder. Further than this I know nothing of it. These seedlings are now five years out on my place. When I received them they were about like one year old osage plants. I planted them on high, dry prairie. Many of them are now sixteen to eighteen feet high, and very thrifty. Never yet has a twig been killed or injured by winter. The tree is neat and trim in form, like the English mountain ash. The leaf and blos-

Digitized by Google

som closely resemble our American species. I have never tried grafting it. From Mr. Hill's son you may obtain further information.

Truly yours,

MOORE BRIGGS.

EFFECTS OF DRY AND WET SOILS.

Mr. Gustaf Eissen, in the California *Horticulturist,* gives some notes of experience which have a special bearing on our severe losses of trees during winters following very dry autumns. It also gives a hint as to the reason why trees on mulched soils, or on which a crop of buckwheat has been grown, suffer less than on exposed surfaces:

We have always been taught that irrigation of trees in fall and winter is very injurious, and should never be resorted to. Alas! for the theorists! Last summer I planted rather tender trees, such as Araucarias, etc., which generally are supposed to be unable to withstand our winter climate. Not knowing any better course, I kept the water away from the trees from the first of October, and the ground got well dried up. As you know, we had very severe frosts about Christmas time, and the trees had been left uncovered. The day before the heavy frost there was a large break in our irrigation ditch near by. The water flowed down, and, to my great dismay, covered a part of that circle where I had my tender trees. Of course I thought they were all gone. The water standing round the trees froze solid, and just as far as the water had reached the trees were saved. The irrigated ground kept moist the whole winter, and after every frost presented the appearance of a heavily frozen surface.

Last fall Mr. MacNeil had 800 orange and lime trees alive, all budded and about five years old. Now there are only 250 left. "Well," said my friend, "a day or so before the heavy frost, the boys on Chapman's forty acres took a notion to irrigate their sheep pasture, and did not care a bit for the big break in their ditch. Accordingly I found, to my great vexation, half of my orange trees flooded next morning. The water had run here and there in the lowest places, of course, and, look here, you may see it plainly, wherever the water did go, there the trees are alive. The dry places were occupied by trees which you now see dead to the roots."

And, indeed, my friend was right, the water had saved our trees, no mistake about that. And now, everybody with facilities for irrigation, keep your trees dry in early autumn, so green wood can get ripe, but give plenty of water before the fruit comes.

Digitized by Google

TRAINING THE CATALPA.

In the *Country Gentleman*, Suel Foster gives some notes of value in regard to cutting young nursery trees close to the ground to cause them to send up erect, vigorous shoots. He says the catalpa is apt to grow crooked and irregular unless treated in this way. In looking over his grounds, at Muscatine, recently, the Secretary saw specimens illustrating the benefits of this mode of treatment. The catalpas cut to the ground when two years old had thrown up straight stems with regular tops, while about all of those not so treated were more or less crooked and irregular. This idea is valuable in the treatment of many trees making an irregular or stunted growth during the first years from the seed.

BLUE BROWALLIA.

The Garden says:

This pretty Peruvian annual is an important plant for furnishing cut flowers through the autumn and winter months. Blue flowers being then scarce, this is a capital plant for supplying them, as it is free as regards growth, easily grown, and flowers continuously. It is also equally well adapted for pot culture and border decoration in summer.

This plant is exactly at home in our hot, dry climate of summer, and should be better known. It is also notorious as a free and continuous bloomer as a house plant in summer, autumn and winter.

TRAINING THE OLEANDER.

Mr. Vick, in answer to a correspondent, says:

Your Oleander tree, if cut back while still in a dormant state and a little before it commences to make a new growth, will branch out freely just below where it has been cut. If you wish to make it branch lower down the stem or trunk, you should cut some notches in and through the bark where you want it to branch; a bud will form and a branch start immediately below each notch.

Digitized by Google

NOTES FROM COLLEGE QUARTERLY.

These notes were written in response to queries coming from all parts of the State to the Secretary. In many cases the same question was received from several sources. The notes are here published for convenient reference, as such questions are continually on our desk:

HOW TO MAKE GRAFTING WAX.

This is an old subject, but recent talk about top-working with wax put on warm, brings us questions as to the mode of procedure. We have just completed working six hundred Gros Pomier trees, put in the experimental orchard a year ago. On these trees we have grafted about one hundred and fifty varieties of Russian apples, received during the winter direct from interior Russia. The job was a short one, as here managed. One man goes ahead and puts a single graft in each tree, by the plan known as side-grafting, about four feet from the ground. The top above the scion is nipped off with pruning shears after the scion is inserted. A boy follows with a fixture something like a very large old fashioned tin lantern, in which is a kerosene lamp with a wax-dish within two inches of the top of the chimney. The wax, thus kept warm, is made of resin, with just enough linseed oil to soften it so that it makes fair chewing gum. The wound made in putting in the graft the boy waxes with a swab, and at once wraps over the wax a little slip of cotton cloth to protect it from the sun, and to hold the graft firmly in place. A man and boy, used to the work, will graft three hundred in a day. We failed to do this, as the labeling of such a great number of varieties takes much time. It is too late for top-working this season, but if trees have been heeled in, it is not too late for transplanting iron-clad stocks for top-working next spring.

THE FLAT-HEADED BORER.

The discussions at the last meeting of the Horticultural Society have perhaps suggested the several queries we have received relative to this pest. The leading query is: "Why does this borer especially attack newly transplanted maples, box elders and apple trees, while those remaining in nursery rows are rarely molested?" The almost total exemption of the Miner plum from attacks of the curculio, well illus-

Digitized by Google

trates the principle involved. In the early stages of growth, this plum is remarkably succulent, and even watery. The crescent marks are often made by the "Little Turk," and the eggs are deposited, but the grub fails to hatch, being literally drowned out by the abundant sap. Precisely in this way the eggs of the flat-headed borer fail to hatch, if inserted in the bark of thrifty and succulent trees. The transplanted trees, or trees checked by excessive pruning, or bad usage of any kind, furnish the *dried bark,* in which the young grubs hatch in perfect condition for work.

This principle holds good, we think, with all the wood and bark borers. Succulent varieties, like Gros Pomier, Duchess, and Plumb's Cider, are rarely attacked by the round-headed borer, unless injured by sun-scald or some other casualty. The Sweet June, Dominie, Jonathan, etc., by their side, with less succulent bark and cambium layer, on the other hand, may be entirely ruined, unless kept washed with alkalies, or some other obnoxious preparation.

The ash tree borer is still more peculiar in avoiding, or at least not breeding in, sappy bark and wood. The entomologists of this country have apparently overlooked these facts, though well known to practical tree planters. In Europe, as early as 1840, the elm trees were destroyed by thousands by a peculiar borer, not yet common with us *(Scolytus destructor).* This beetle perforates the bark in depositing its eggs. M. Robert, of France, in studying the habits of this beetle, soon found that she would vacate a channel in which the sap freely exuded without depositing eggs. In all cases of mistake, where eggs really were deposited in the succulent bark or cambium layer, he found the grubs perished, even in the few cases where they hatched. The remedy successfully inaugurated by Mr. Robert, exactly confirms the idea we wish to express.

The large trees infested were stripped of their outer bark in June, and the trunks shaded. The new and succulent bark, which soon reformed, was too sappy for the beetle to work in. The fine old avenue and park trees were mostly saved in this way. Thrifty seedlings of maple and box elder, may safely be planted without protection, as in plantation, with good care, they soon become thrifty and succulent. But trees of larger size, put out in lawns, parks, or by the roadside, should in all cases be kept whitewashed, as noted in preceding comments on box elder for live fence posts.

Digitized by Google

DWARF JUNEBERRY.

"Is the dwarf Juneberry, such as was grown by Dr. Hall, of Davenport, for the Whortleberry, worth setting out? If so, where can the plants be obtained?" We have received this inquiry from several sources. It is a native of our State, near Waterloo, and perhaps in other sections. If only a few plants are set out the birds will get most of the fruit; but if set out in plantation, quite thickly so it can be cultivated, as is done by Dr. Hall, it becomes a valuable and profitable fruit. It is very hardy and will thrive on any of our open northern prairies, and should be extensively planted.

We notice that the Massachusetts Horticultural Society awarded, last season, the Society's silver medal to Benj. G. Smith, as a reward for his introduction and exhibit of this fruit. Dr. Gray has named this variety of *Amelanchier Canadensis, "oblongifolia."* It can be obtained at Davenport and of the nurserymen at Waterloo, Council Bluffs, and most likely at your nearest nursery.

TO INDUCE FRUITING BY WIRING THE BRANCHES.

When is the proper time to girdle the branches of refractory fruit trees with wire to induce fruiting? This query is an important one with those who wish to secure specimens of fruit from new varieties. We have often secured fine specimens on trees only four or five years old, by tying a wire around an unimportant limb early in June. It is not necessary to twist the wire very tightly, as the enlarging of the branch during the growing season will completely bury the wire in the bark. In the fall the portion of limb above the wire will be found larger than below, and a large portion of the leaf buds will be found transformed into fruit buds by the prematurely hardened and perfected condition of the cell structure, brought about by the strangulation. Aside from the purpose named, it will in no case prove profitable to secure fruit in this way.

PEAT FOR APPLE TREE MULCHING.

A correspondent asks, "What did Peter M. Gideon, of Minnesota, mean at the horticultural meeting, when he said he liked peat, or muck, best for mulching fruit trees?" In Minnesota, as in this State, are found peat beds or bogs. If in a dry time this material be thrown out where it will be acted upon by the weather, and the frosts of win-

Digitized by Google

ter, it dissolves, forming a light vegetable mould. He reports that he mulches at the rate of two loads for three trees, spreading it over an area fully ten feet in diameter. After the coating gets old and fine in texture, by action of the frost, snows and rains, it furnishes just the kind of nutriment his trees seem to need. His orchards giving the most and best fruits, are mulched in this way.

Some experiments with decomposed peat, during the past season, would indicate it to be a valuable manure for our uplands. Last spring we mixed it heavily with prairie soil for the manure covering of a hot-bed in which tomato plants were grown; the plants grew so rankly that they touched the glass before those in an adjoining bed were six inches in height. Of course this rampant growth was a disadvantage, but it taught the lesson that peat contained the essentials of plant growth, and the bed needed very little water. During the past winter we have tried it mixed with earth in flower pots, and find that plants do well in it, so far as tried. Some Calla lilles, potted in pure pulverized peat, have flowered more continually and perfectly than any we have ever tried.

In orchards it is more than probable that this material will prove very useful, as Mr. Gideon reports. Its nature is such that the surface roots of the trees can come up near to the surface, as they do in the leaf mould in the forest. We hope to see it extensively tried in the orchard, the flower and vegetable garden, and on our upland wheat and corn fields.

ARE PISTILLATE TREES OF THE ASH AND COTTONWOOD INFERIOR IN QUALITY OF TIMBER?

This question was propounded by a German recently visiting at the college, and is one worthy of careful investigation. We hope the readers of the *Quarterly* will report their experience and observations, as we claim to know but little about the subject, yet we have repeatedly made the remark, within the past five years, that we had never seen an ash tree bearing seed freely that attained large size, or that was close, tough-grained, and valuable for manufacturing uses; and that all the seed-bearing cottonwoods we had seen, from one boundary river to the other, were called by the wood men, "white cottonwood."

In this country this subject has not attracted attention, but in Europe, as early as 1650, John Evelyn in a report to the Royal Science Association of England, said: "The very axe will tell you the difference of the sex, the male being so much harder and browner in wood

Digitized by Google

than the female." Knight, Billington, Townley and many other practical writers upon forestry express the positive and decided opinion that the timber of the staminate trees of the ash and the poplars, is much superior to that of the pistillate ones, and that in given time and under similar conditions, the male trees reach the greater size, have richer and denser foliage, and in every way prove superior to the female trees for purposes of utility or ornament.

We have seen at least one monœcious ash tree in Iowa, bearing a few seeds in its top, which attained large size, and proved upon cutting to be first class timber. But where regularly dicecious, the pistillate trees are invariably inferior in tree and in quality of timber, so far as we have observed. That the yellow cottonwood is nothing but the male tree of *Populus monilifera,* we are not as yet prepared to say. This is perhaps as yet a speculative question. If there is nothing in it, and our friends succeed in making the real truth apparent, our purpose in calling attention to it is gained.

TARRING SOFT WOOD LUMBER AND POSTS.

Many correspondents, who have received the *Forestry Annual*, ask us to give the most approved method of applying the coal tar. We have very little home experience as yet to record, but in England, where this plan has been long in use, in some sections, the *Gardener's Chronicle* gives what seems the most sensible plan. A cheap vat is constructed something on the principle of our war time sorghum pans, with plank sides and sheet iron bottom. This trough need not be made more than two feet in width and of the length of the fence boards to be dipped. It is set on a brick flue. A small fire under it to keep the tar boiling hot. The boards are placed in the tar loosely, as many as will be covered with the tar, and boiled at least fifteen minutes. They are then taken out with nippers made for the purpose, giving a moment's time for each board to drain. Lombardy poplar, willow, abele, white elm and other soft, perishable timbers, treated in this way, have been found very strong aud durable, and not liable to warp. The fresher and greener such lumber is when dipped, the better the tar will penetrate the pores of the wood. Round poles of the same soft wood species, with the bark shaved off, cooked in the boiling tar one hour, have proven as durable as oak posts set green.

Digitized by Google

PEAR GROWING ON THE PRAIRIES.

"It is probable that we will secure varieties of the pear from Northern Europe that will prove as hardy here as the Duchess and Gros Pomier apples, and bear paying crops of good quality." Quite a number of letters have been recently received on this subject. We can only report progress in our work of experimentation. We have received from several parts of interior Russia, since our last issue, about twenty-five varieties of pear scions, all of which are said to be hardy on the Russian steppes, where not a single variety of the apple from the portions of Europe south of the Caucasus range will endure for a single year. The varieties sent are said, by the President of the Russian Agricultural College, near Moscow, to be of fine size and appearance, and excellent for culinary use. A few of the summer sorts are good enough in quality for dessert use, but not equal in delicate flavor and aroma to the best French and Belgian varieties.

We are very confident that all the varieties imported will prove hardy here, and that they will bear remunerative crops of satisfactory fruit, provided we work them on roots or stocks hardy enough to endure our arctic winters. In Russia, seedlings, grown from the seeds of the native wild pear are used for stocks. We have little faith in the apple for a stock, though *now* favorably reported on by many writers. At present the most available stock, for root-grafting, seems to be the mountain ash, on which the pear unites readily. Some of the finest pear trees we know of in this State and Illinois, are on this root. By deep setting, the Russian varieties will very soon root on the scions, as, like the northern forms of the apple, their pears strike more readily from cuttings than those of southern Europe. If thrifty young seedlings of the free growing thorns are used, by either grafting or budding in the top, they can be relied on for making long-lived and profitable trees. We have not found it profitable to root-graft the thorn. In England, where winter killing of pear roots is never thought of, the pear is worked on the thorn for planting on loose, friable soils.

VALUABLE LATE-KEEPING APPLES.

While writing these *Quarterly* Notes, I am reminded by a friend to bring up from the cellar some specimens of the late keeping varieties of the apple, which we have every reason to believe iron-clad.

Digitized by Google

Scott's Winter—From Vermont, is a red apple of medium size, and a first-class keeper. It is the sourest apple and the best in quality we have yet seen among the iron-clads that would keep well until June.

Belle De Boskoff—This is a Russian variety, of fine size and first-class quality; it is now, April eleventh, rather beyond its season, although the specimen was kept on a shelf in the office of Charles Downing, New York, a month or two before it was forwarded here. It is evidently a late-keeper.

Wrightman—This northern Wisconsin variety is yet firm and solid, looking as though it would keep until June. It is a fine-looking apple of good size and quality. The tree has proven hardy in northern Iowa during the test winter of 1872-3, and since.

Rich Greening—Not so firm or so late a keeper as the above. Fully as large as Rhode Island Greening, but more regular in shape. The tree is hardy beyond doubt up to the Minnesota line on favorable soils.

Balch—This seems to be a sweet apple, although not so recorded in Wisconsin, where it originated. It is as firm as when put in the cellar last fall, and will evidently keep until August. Not likely to prove profitable, although the best keeping sweet apple we know.

Black Oxford—This variety was introduced into the State by the writer in 1860. The tree has proven eminently hardy, even in Minnesota, but attention has not been directed to it as a valuable apple, as Downing reports it as "a long keeper of poor quality." The fruit grown last season was tested during the winter by competent judges, who pronounced it first-class, after removing its remarkably thick skin. It is best in quality of the varieties tested at this time.

In connection we will state that to-day we received a note from Dr. Hoskins, of Newport, Vermont, saying: "To-day, April 9, I have tested a Russian variety fruited here last season. It is the Repka Malenka of the list imported in 1870. It is about like Ben Davis in quality, and fully as large but not as showy. It is apparently an everlasting keeper."

THE TURNER RASPBERRY.

Several correspondents ask where this variety can be procured true to name, and for an honest expression as to its value for general cultivation. It was originated by Dr. Turner, of Jacksonville, Illinois. Had a corner been made on its propagation and sale, as is too often done with new fruits, the Turner would have been more persistently puffed in the papers and catalogues. It has been slowly disseminated, but has made friends wherever it has been tried. It bears regular crops, of good size and rich flavor, with good care. Like all the red varieties of good flavor it is quite soft for shipping, but it brings in our markets, where known, a better price than the black caps.

Digitized by Google

In connection we will say it is not yet too late to put out raspberry plants where early planting has been neglected, or where vacancies are to be filled. The young plants, starting from the roots of the red varieties, or the rooted tips of the black sorts, can be safely transplanted on cloudy days as late as the first of June. No more care is needed than in putting out cabbage plants, nor, indeed, as much, if the roots are kept wet and the growth of top is not more than four inches.

LIVE FENCE POSTS.

In the *Forestry Annual*, the box elder, grown in thick plantations where it will form straight stems, is recommended for live fence posts. Several correspondents have admitted the fitness of the tree for this purpose, when started in the right way, but have urged as an objection to its use its liability to be attacked by the flat-headed borer when transplanted. This objection is well founded, but the trouble of coating the tree, when transplanted, with a wash of lime and sulphur, entirely does away with this objection.

Again, it is urged that it takes time to grow the straight trees to set out for this purpose, and that willow and cottonwood trees, to be taken out in thinning groves already started, will do fully as well for fastening the barbed wires to, as recommended by Suel Foster. Beyond the shadow of doubt, the latter trees will make fully as strong and durable supports for the wire, and they will answer for wind barriers as well, or even better. We only recommend the box elder on account of its even and symmetrical growth, presenting a neat, artistic expression as a border to our prairie fields. It is also true that crops can be grown much nearer to a row of box elders that can be done with the willow or cottonwood, as the roots of the former run deeper and do less soil robbing, and its tops shade less surface.

THE MINER PLUM—WHY DOES IT FAIL TO BEAR FRUIT?

This variety has been widely disseminated in all parts of the State, and many thousands of trees have attained a diameter of trunk ranging from four to eight inches. The complaint comes from various sections that although the trees blossom profusely, the fruit rarely sets, or if started, it drops when not much larger than peas.

This plum is a rampant grower, and when conditions are moderately favorable, it ultimately attains remarkable size. The original trees, near Galena, Illinois, have trunks over fourteen inches in diameter, and

Digitized by Google

a spread of top like old-fashioned apple trees. The old trees, wherever found, produce great crops of desirable and salable fruit, when we have crops of native plums. The exuberant flow of sap of the young trees, is a main cause of failure to set and hold the fruit. Trees allowed to grow with dense bushy tops until they are from four to six inches in diameter, can usually be established in habits of bearing by severe thinning out and shortening in of the tops, just *when the blossoms are about unfolding* in spring. We hope this plan will have a fair trial, and that our readers will report results.

CONDITION OF NURSERY TREES.

This has been a favorable autumn for noting the habits of early or late maturity of varieties. The extremely hot, dry summer, followed by a warm autumn with occasional heavy showers, has been by no means favorable for perfect maturity of cell structure of nursery trees, or young, rapid, growing orchard trees. While varieties, truly iron-clad, such as Duchess, Tetofsky, and Wealthy, are as usual perfectly matured to the tips of the growing shoots, less hardy varieties, such as Gros Pomier, Fameuse, Ben Davis, and even Walbridge, are by no means perfectly matured.

Under these circumstances we are pleased to report that, with perhaps half a dozen exceptions, our hundreds of Russian varieties, even in the one-year old nursery, have their terminal buds sound and ripe. The few exceptions to this rule are from the nursery of Dr. Regel, of St. Petersburg, and we suspect that they are German varieties with which he was in 1870 experimenting.

We are also pleased to report that the Canada varieties, such as Canada Baldwin, Calville of St. Hilaire, Pomme de Fir, St. Hilaire, Decaire, etc., are matured fully as well as Walbridge.

The Vermont iron-clads, such as Magog Redstreak, Scott's Winter, and McIntosh Red are also in fine condition.

The many new varieties from Wisconsin also give evidence of determinate habits of growth. Especially the Wrightman, Wrightman Blush, Wolf River, Rich Greening, Peffer's No. 1, Wicher, Leitch, and Peffer's Golden, are fine growers and perfectly matured.

Some of the not well known varieties, originated in Northern Iowa, are very promising on the score of knowing when to ripen their woods. Rogers' Spitzenberg, Joe Davis, Excelsior, Duke of Blackhawk, New Porter, and several others are far better matured than Ben Davis.

Digitized by Google

In connection we will again note that the Belle de Boskoff has made a great growth this season, yet the wood is now nearly as firm as that of the Duchess. As a fine winter apple of choice quality it is very promising

KEEPING SCIONS FOR SPRING BUDDING.

We find on our table a note asking us to give directions in the *Quarterly* for keeping the "bud sticks" for spring budding, and the best time and method for the performance of the operation on the rose and cherry. This item may not be thought seasonable, yet it is well to plan work of this kind some time in advance.

If our people knew how easy it is to convert in this way a worthless wild or common June rose into one of which we may be proud; or a worthless red Morello cherry into a bountiful-bearing Early Richmond or English Morello, we should see more of it done in every neighborhood of the State.

The spring budding of all ornamental shrubs and fruit trees may be performed most successfully in June, when the rapid formation of new cell structure is taking place in the cambium layer. The scions from which the buds are taken should be kept back by keeping moderately dry and in a cool place. With the approach of warm weather in the spring, they may be kept back best in the sawdust of an ice house. The budding may be done in the usual way, but it is better to invert the usual cut, and shove the bud upward, selecting a place in the stock where the bud may be inserted just *under* a strong tuft of leaves. All things considered, it is best to tie the buds with woolen yarn, as it may be left on a long time without injury to the tree.

Buds unite very freely and perfectly at this season. In our climate the main trouble comes in after treatment of the stock. To this we wish to call special attention. In the rose and cherry, for instance, if the stock above the bud be not interfered with, the bud will be grown entirely under before fall. On the other hand, if the top above the bud be cut off, the stock will be seriously injured, and the bud will make a growth not likely to withstand the succeeding winter. Practical cultivators get over the difficulty by bending over the stock above the bud, and tieing it in a circular form to the stock, from one to three feet below the bud, depending on the length of the top above the point of insertion. In this way the bud starts at once, making a vigorous, healthy growth the same season, and the stock is not injured. The top above the bud may be removed early

Digitized by Google

the next spring, close above the point where the bud was inserted, and the wound covered with liquid shellac.

FALL GRAFTING OF THE GRAPE.

We are requested to give the best method of grafting the grape, and whether it is profitable to attempt the operation in the autumn, as recommended by A. S. Fuller.

We have tried fall grafting of the grape by inserting the scion below the surface, and covering heavily with mulch, after inverting a flower-pot over the scion. Our success was in no case so satisfactory as when the operation was performed in the spring after the leaves were expanded.

In grafting the grape *above* the ground, we have not had satisfactory success, except by the process known as inarching. Neither has our success been encouraging in cutting off large vines and putting in one or two scions, just below the surface, to take the full flow of sap. But a method of inserting grafts into large Clinton or wild vines, that we learned of J. P. Manny, of Freeport, Illinois, we have found uniformly successful. We hope every reader who has vigorous vines of worthless sorts on his grounds, will try this plan next spring, and report results.

Lay the vines in a trench twelve to fourteen inches deep. After the trench is filled, the laterals will be projecting above the surface. After the extension of growth in the spring has checked the flow of sap, insert scions of Moore's Early, Lady, Worden, or any other desirable new or old variety, in the laterals just below the soil level. Tie the scions in place, and cover the cut surfaces with a heavy plaster of moistened clay, then bank up the earth to the top bud of the scion. As to method of grafting, it seems to make but little difference. If the scion and lateral are about equal in size, the cuts may be made *long,* as in root-grafting, but omitting the tongues.

Varieties like the Delaware, difficult to propagate by cuttings, will grow freely root-grafted on small pieces of roots. This is most successfully done by cutting a wedge at upper end of root, and setting the scion on it by the plan known as saddle-grafting. Tie with waxed thread, and keep through winter the same as root-grafts of the apple.

OAK-LEAVED MOUNTAIN ASH.

This beautiful tree is now quite common in Western New York, but as yet is but little known at the west. A specimen planted on the College lawn about eight years ago by Prof. Matthews is now over

Digitized by Google

eight inches in diameter near the base, with a low, compact, symmetrical top, attracting the attention of all visitors on the College grounds. It seems more rapid in growth, hardier, and far more beautiful than either the American or European Mountain Ash. Prof. Matthews imported this tree from the nurseries of Andre Leroy, under the name of *Sorbus quercifolia*. In the New York nurseries it is known under the common name of Oak-leaved Mountain Ash. It is quite probable that it is a variation of the *Pyrus Aria*, or White beam tree, generally distributed over Europe. In leaf, bud, color of bark, and rapidity of growth it approaches very nearly to the *Pyrus Aria intermedia*, of Loudon. In Sweden, where the latter tree is native, it is used to a considerable extent as a stock for the pear.

We do not know that the White beam *(Pyrus Aria)* has been used as a pear stock in this country. We propose to give it a trial in our experimental grounds as soon as practicable. In the meantime we advise the extended trial of the Oak-leaved Mountain Ash as a lawn tree of rare beauty that can bid defiance to our summer's heat and winter's cold.

TOP-GRAFTING THE WILD CRAB.

Mr. R. M. Reid, of Louisa county, reports that he has in orchard 200 trees of Soulard crab, which he put out with a view to making cider from the fruit. He now has doubts as to the relative value of the Soulard for this use. He asks: "What varieties will succeed best top-worked on the Soulard and on the wild crab?"

In leaf, wood, and habits of growth the Soulard is practically identical with the wild form of *Pyrus coronaria*. Around Galena, Illinois, the Soulard was used to some extent as a stock several years since. The experiment was by no means satisfactory. A few varieties unite moderately well, prominent among which are the Willow, Tetofsky, Hewes' Virginia crab, and a variety locally known in Iowa as Morrison. But even with these it is not a satisfactory stock, except in cases where the scions are inserted in native crab thickets.

A demand is springing up in our larger western cities for the Soulard crab fruit for culinary use, as a substitute for the quince for preserves, and mixing with better fruit to which it imparts its aroma.

BARK BURSTING OF NURSERY TREES.

We have a letter from a well known nurseryman of the western slope saying that his two-year-old apple trees have extensively bark-

Digitized by Google

bursted at the usual point—just above the crown—this season while the trees were still making rapid growth, and before the advent of severe frosts. He asks us to give an opinion as to the probable cause.

This bark-bursting of young trees, with a large portion of the newly formed cell structure in their trunks, may occur at any time from the middle of September to the middle of March, when the conditions are present as to sudden accession of moisture after a season of deprivation of water by drought, or severe freezing. In this special case the severe drought of August and the first half of September was followed by sudden flooding of the tissues with water during the copious rains in that section the last of September.

We have long believed that a sudden supply of water, after a period of unusual deprivation, had something to do with the rupture of nursery trees, and also with the bursting of such fruits as the tomato, grape, cherry, etc. Prof. Bessey informs us that the researches of German biologists shed much light on the exact manner in which the injury occurs. The protoplasm of newly formed cells is in some respects like glycerine in its capacity for absorption of water. In its sudden imbibition, as the Germans express it, of water, after a season of scant supply, an actual swelling of the tissues takes place, somewhat like the swelling of a sponge as it absorbs water. The sudden imbibition of large amounts of moisture through the bark near the earth's surface, added to the liberal supply from the roots consequent upon copious rains after a season of drought, or in winter after a season of severe freezing followed by melting snows, may cause the tissues near the ground to become so enlarged as to rupture the inelastic bark.

Varieties seem to vary in capacity for absorbing water through the bark at the earth's surface. For instance, the Warfield, notorious for bursting, will retain a moist, and even wet, bark for three or four inches above the ground, apparently by capilliary attraction, during a dry, sunny day, when the bark of a Duchess at this point will be perfectly dry.

Other considerations connected with lessened evaporation consequent upon seasons of lowering temperature in autumn and severe freezing in winter we cannot here consider.

GOVERNOR GUE APPLE.

We have received a box of specimens of this promising new apple. It originated on the grounds of H. Ross, in Hamilton county. The

Digitized by Google

original tree is now thirty-three inches in circumference, eighteen inches above the ground, with a spread of top of twenty-one feet. Mr. Ross thinks a finer specimen of the apple tree cannot be found in northern Iowa. The fruit is of medium size, uniform and handsome, and about acid enough for a pleasant eating opple. It seems to be of about the same season as the Fameuse.

VIRGINIA CRAB.

A correspondent of Buchanan county writes that he got of us a few years since some trees of Hewes' Virginia crab, and that contrary to his expectation they kill back badly in the branches during severe winters. He is surprised at this, as he hears that the Virginia crab is hardy in northern Minnesota.

This is not the first time we have heard of confusion relative to these very distinct varieties. The Hewes' Virginia crab is a famous cider apple of some of the older States. It plainly belongs to the common south-of-Europe form of the apple, and the tree is little, if any, hardier than the Rambo. The Virginia crab has a leaf larger and thicker than the Duchess. It beyond all doubt is of Chinese or Russian origin, and, if possible, hardier than Duchess or Tetofsky. It should be better known in northern Iowa for its fruit, and as a stock for the less hardy varieties. In the St. Paul market it is said to sell better than any one of the many varieties of crab there grown. We have in no case known it to blight.

In connection we wish to remark that it is a great mistake to suppose that all our crabs are variations of the Siberian. We have growing in nursery about a dozen varieties of the crab from Canada, Vermont, and Wisconsin, which show no trace of Siberian origin in leaf, bud, habits of growth, or fruit. Beyond all doubt or question they are of the Astrachanica family, and most of them, we think, have sprung from the seed of the Tetofsky, which is nothing more or less than a Russian crab.

We would be glad to distribute to actual planters on our northern prairies a few hundred of these thick-leaved new crabs, some of which are really valuable, where larger fruit is scarce, for eating.

CHINESE RASPBERRY.

It is well known that we have no variety of the raspberry strictly hardy on our exposed prairies. The Turner, Philadelphia, and Mam-

Digitized by Google

moth Cluster we often find in spring too low in vitality to produce fair crops of perfect berries. Recent correspondence with intelligent observers, residing in northern China, develops the fact that perfectly hardy varieties of the raspberry, bearing fruit of large size and quality, are grown in that country, and in Siberia and Manchuria.

Through the kindness of Prof. C. S. Sargent, of the Bussey Institute, we have received a packet of seed of *Rubus cratægifolia.* Prof. S. reports the largest specimens of fruit to measure six-eights of an inch in diameter, and rather longer than broad. The fruit is "large, firm, clustered, of brilliant orange scarlet color, and with a flavor much like the Black Cap." The Professor suggests that if the quality is not quite good enough for table use, it will be likely to originate, by crossing choice varieties, much hardier in canes than any we now have.

PROMISING NEW GRAPE..

At the recent State Fair, the premium offered for the best seedling grape was awarded to James Stanton, of Des Moines. About eight years ago, Mr. Stanton reports, he planted quite a quantity of Delaware seeds, washed from pomace of Delaware grapes used in wine making. Several thousand seedlings were grown, from which about three hundred were selected and planted in vineyard rows. As they were not protected, many were killed out the succeeding winters. The few vines finally fruiting produced all grades of fruit, from small, sour, black specimens, with leaf precisely like our wild vines, to various-sized amber-colored clusters. Only one of the latter was hardy enough in vine and good enough in quality of fruit, to be considered an acquisition to our fruit list, and this was exhibited for the first time at the Fair. The fruit is much like Diana in size, color, and quality. As it seems as hardy and prolific as Concord, it is likely to prove a valuable acquisition when propagated and distributed.

A JAPANESE CONIFER.

We planted last spring the seeds of three Japanese conifers. One of these, *Retinospora obtusa,* is a novelty in the way of rapidity of growth from seed and ability to withstand intense heat and drouth without injury. Some of the plants came up and grew during the hot, dry summer in open exposure to wind and sun. During the late freezing weather they have still been exposed without a single leaf being tinged. The tree has proven hardy in the Eastern States, and it seems more

Digitized by Google

than probable that it will prove an acquisition on the prairies. It surely will, if hardy, as we have nothing in the whole list of conifers more beautiful.

THE WORDEN GRAPE.

We have a few vines of this variety in bearing in Iowa which, so far, are very promising. We have several queries from parties who saw the fruit at the State Fair, as to its origin, probable value to us, price of vines, where obtainable, etc.

It was originated, we think, by S. Worden, of Minnetto, Oswego county, New York. It is claimed to be a seedling of Concord and most likely it will prove equally hardy. The fruit is larger, earlier in ripening, and, we think, considerably better in quality. It is worthy of quite an extended trial, even in Northern Iowa. We do not know that it has ever been sold at fancy prices, or that it has been lowered in vitality by rapid green wood propagation under glass. It is offered at reasonable rates by nearly all leading propagators of the grape.

AMPELOPSIS QUINQUEFOLIA.

This beautiful vine, familiarly known as Virginia Creeper, is quite rarely seen about our prairie homes. It grows with great rapidity and soon covers brick walls, old trees, or other objects, which we may desire to clothe with beauty. In Europe, we are told, this native plant of ours is regarded as a perfect treasure, especially in the autumn, when its foliage, touched with the first frosts, is gorgeous with its many-hued tints. We are specially impelled to write this note by daily observation of the vines clustering on the walls of one of the buildings on the College grounds. We doubt whether it can be equalled as an object of rare beauty at this season of the year by any ornamental vine of other species in the State. The vines are readily propagated by layers or cuttings.

DOWNER'S SEEDLING STRAWBERRIES.

Taking all things into consideration, it is doubtful if we have three more satisfactory varieties of the strawberry than those given us by the lamented J. S. Downer, of Kentucky. Some rows of Downer's Prolific, Charles Downing, and Kentucky, are now loaded with their fourth heavy crop, and they seem all right for further profitable service. Of this trinity, we need say nothing of the prairie behavior of the first two named. The Kentucky is not so well known, and we

Digitized by Google

wish to say a good word for it. So far as we know, it is the most desirable late variety in our list. The leaf is superb, the fruit stem is erect and strong, the size and quality of fruit are of the best, and the fruit for the past three years has been in prime eating condition for a week after even the sour Colfax was gone. Every home should have this variety, and the two preceding ones as well.

THIRD GENERATION OF PEARS.

We have received some pear scions from the old settler, G. P. Peffer, of Wisconsin, which he reports to be the third generation which he has grown from the seed at Pewaukee. As to hardiness, if all attempts at acclimation were as successful as this, we might surely hope in the near future for a generation of fruit trees of our own producing that could stand any phase of our climate. Young trees exposed to a temperature the past winter of twenty-six degrees below zero, are not in the least colored in the terminal points of the scions, while the Flemish Beauty, and other sorts we have called hardy, are so discolored as to seem ruined. Friend Peffer deserves much credit for his persistent labors in the way of attempt at acclimating fruits by systematic seedling production.

VARIED FRUIT OF PISTILLATE STRAWBERRIES.

The varied behavior of the Green Prolific strawberry has given rise to much discussion at our western horticultural conventions. Proper provisions for fertilization will, of course, account for part of this varied experience, but our growers of this and other pistillate varieties fail to agree as to size, color, and even quality of fruit.

Some observations of the writer, for the past fifteen years, lead to the belief that such varieties are varied in fruit by the varieties used in fertilizing. Attention was first directed to the subject by the varied character of fruit of three separate plats of the Colfax. In one case the Colfax row was adjoining one of Downer's Prolific; the second was adjoining the Wilson; the third was by itself, but was fertilized at one end by some plants of a fine variety of our wild species, put in row for experiment. The beds were set the same spring, had the same general care, and the soil was little varied. The unfertilized end of the row produced, as usual, only a few imperfect, flattened berries; the end fertilized by the native variety bore small, extremely acid fruit, long, slim, and pointed. The row fertilized by Downer gave a fine crop of berries, quite light in color, large in size, broad at base, and better in quality than is usual with the Colfax. The row fertilized by Wilson

Digitized by Google

gave very dark purple fruit, fully as large as the latter, but irregular in size and decidedly acid.

We have since found the Russell and Green Prolific to vary in fruit to fully as great an extent with the variety used in pollenizing. In our climate it is common to find apple trees imperfect in stamens, and we have noted decided changes in the fruit, as a result, beyond doubt, of foreign fertilization. We refer to the subject at this time with the hope that the readers of the *Quarterly* will contribute their notes of observation.

We have only space to add that we have parallel cases in the field and garden crops. If the purest seed of two kinds of squash, cucumber, or melon, be planted together, we have all noted modification the first season in the product. If we plant red and white corn adjoining, the kernels and cob—receptacle—will be changed in size, form, and color. When we mix in row white and green-podded peas, we will often find cases of pods as well as peas modified in shape, size, and color. If such things occur with species supposed to be perfect in flower, how much more likely to occur when the fertilizing pollen is entirely foreign, as with the pistillate strawberries.

We specially hope our friends will send us well-considered notes of observation on this interesting yet neglected topic.

GAS PLANT—*(Dictamnus fraxinella.)*

A card laid aside for this department says: "I saw last summer, at my old home in New York, a very fragrant plant, which my friends gave the name 'Gas Plant.' The whole plant, but especially the flowers, has a very agreeable odor, something like that of a lemon-peel, but far more pleasant. Do you know the plant, and will it prove hardy here?"

The Gas plant is, we think, perfectly hardy here without winter protection of its roots, although we have always covered its roots, as we do the peonies and about all the perennials. It is very desirable, not only for the beauty of its leaves and flowers, but as a rare curiosity. The common name is derived from the combustible vapor which is given off by the oil-glands at the base of the flower-spike. If a lighted match be applied at this point the oil will burn with a flash, enveloping the flower with a sheet of flame, yet seeming to do no injury to the plant. This may be repeated each evening when the weather is very warm. The plants flower the second year from the seed. The seeds

Digitized by Google

are very hard and resinous, and will not vegetate, unless boiling water be poured upon them, until the second year after sowing, and not always then. Old plants may be divided early in spring, being sure to retain an eye on each root planted out, as with the dahlia.

MULCHING OF SMALL FRUITS.

The advice has been given, by soft-handed writers in certain journals, to remove mulching from gooseberry, currant, and strawberry plantations during summer. This brings queries as to whether the advice is good. With our intense, dry, summer heat, the summer is the very time when our small fruits need the mulching. The currant and gooseberry will give little fruit without the continued heavy mulching. The raspberry, with nice culture, may do without the mulch, but the quality and quantity of fruit are much bettered by heavy mulching all over the ground just before the fruiting season, cultivating the early part of the season and working in the mulching of the preceding year. The strawberry covering of winter should be raked between the rows to hold moisture, and to keep the paths from becoming hard and dry.

WIND-BREAKS ON THE SOUTH AND WEST.

A friend, after looking over our last Horticultural Reports, asks: "Why do our fruit-growers recommend planting wind-breaks on the south and southwest of small-fruit plantations and orchards?" It chanced that a day or two since the writer of this question visited the College grounds. We assured him that the answer to his question could be found on close inspection of the new Russian orchard. It so happened that a few rows of Gros Pomier were top-worked with Russian varieties during a gale of four or five days continuance from the southwest. One end of a part of the rows grafted at this time was protected from the wind-sweep by a maple grove. On this end about all the grafts grew. On the exposed portions two-thirds of the scions failed, literally dried up by the rapidly moving air, which most of the time contained only from 18 to 30 per cent of moisture. The grafting done on this plot on the days immediately following this withering southwest gale was a perfect success, not one scion in a hundred failing to start vigorously.

In the central and western part of the State these spring and summer winds from the plains of New Mexico, are often absolutely ruinous

Digitized by Google

to evergreens, small fruits, flower gardens, many varieties of orchard fruits, etc., in positions directly exposed to their rake.

THE QUINCE ON JUNEBERRY STOCK.

A friend in Illinois writes that he has tried top-working the quince on the apple, thorn, and Juneberry. Those on the latter stock have united most perfectly and borne satisfactory crops of fruit. F. K. Phenix, of Illinois, directed public attention to the Juneberry as a successful stock on which to grow the quince, several years ago, giving the assurance, derived from actual experience, that on this stock the quince seemed to mature earlier in autumn, and to endure our severe winters about as well as the apple. We have much to learn yet relative to the influence of stock upon scion, especially when stock and scion are of different species, and different in habit and mode of growth. We have much evidence on which to found the belief that the growing parts between the young stock and scion, where the union is congenial and perfect, intermingle cells, and, reciprocally, the new top modifies the growth of stem and root, and the modified stem and root may change the habit of growth, time of maturity of foliage, and even size and character of fruit in special cases.

GRAFTING ROSE ACACIA.

A postal is on our table asking if the Rose acacia *(Robinia hispida)* can be grafted on the Honey locust, and if so, for the best method of doing the work. It may be possible to top-work the Honey locust with this beautiful shrub. It is worth trying. We have seen beautiful specimens of Rose acacia top-worked on the common Yellow locust. The grafting is very easily done by any method successful with the apple. We have seen nothing more beautiful in the ornamental tree or shrub line than a nicely-rounded head of Rose acacia loaded with bloom, on a smooth, straight stem, three or four feet in hight, of the common locust.

GRAFT HYRRIDS.

A small lot of mixed red and white potatoes were planted by the writer a few years since. At digging time a number of specimens were found with a portion of the skin pure white and a portion pure red, the divisions being as distinct as those on mixed kernels of corn. On careful inspection of these mixed hills, it was found that these specimens were the offspring of united subterranean stems of the red

Digitized by Google

and white varieties. In other words, they were strictly *graft hybrids.* On the College grounds, the past year, the same thing occurred in mixed hills.

Can such results be obtained by uniting grafts in horticultural operations? The story is old that our half-sweet and half-sour varieties of the apple were produced by inserting carefully united split buds. As yet we have no authentic accounts of an operation of this kind except in the way of an experiment tried by Thomas Meehan, of Philadelphia, a few years since. He inserted twenty split grafts of Red Astrachan and Rhode Island Greening. In dividing the graft, of course he used great care in splitting the terminal buds. Only three of these spliced grafts grew. In 1875, he reported that the halves grew together perfectly, and that one had borne fruit which was Red Astrachan in all respects. In a letter just received from him he reports that another of the grafts bears large, pure white flowers like those of Rhode Island Greening, while the fruit is as red as Astrachan and so much like it as to show no material difference. The total change in the character of the blossoms is decided proof of intermingled cell-growth, and it is more than possible that, as the tree attains age, a greater variation in the flavor and appearance of the fruit will be evident. In the cases where the uniting of the bud was perfect, we should expect the Red Astrachan to exercise a leading influence on the character of growth and fruit. We know of no variety growing as readily from cuttings or layers. In root-grafting, too, it exceeds most varieties in rapid formation of cellular tissue on the cut surface of the scion.

BERBERRY SEEDLINGS.

We have two letters of inquiry from Hancock county, asking for best method of germinating Berberry seeds for hedging purposes. Both letters speak of fine specimens of this hedge in that section which are effective as stock-barriers and decidedly ornamental. We have grown many thousands of seedlings with as uniform success as we have realized in growing apple seedlings. The berries are picked when fully ripe and at once mixed with pure river sand and buried in a covered box with the top covered with three or four inches of soil. When the ground will do to work in early spring, crush the berries in any convenient manner to separate the seeds, and sow with the sand in which they were packed.

We will add the suggestion that the common Berberry is well worth

Digitized by Google

growing in our gardens or yards as an ornamental shrub and for its fruit. We have reason to believe also that in the near future we shall have on trial in the State varieties—perhaps we should say species—of this fruit far more valuable for culinary use or for eating than the currant. In eastern Asia, we are told, are grown species bearing fruit which is dried for raisins. The *Berberis Asiatica* and *B. aristata* are grown on the arid plains of Nepaul and Thibet, and one variety known as *Chitra* grows on the mountains of Nepaul at an elevation of from five to seven thousand feet, where Mr. Royle says the fruit "is dried like grapes, for forming raisins, in the sun." We have on the College grounds a smooth-leaved species received from Japan, under the name of *Berberis Thunbergia*, which may prove valuable for its fruit. These Asiatic species have been tried in England, but this trial has no value for our guidance. Our hot, dry summers approach more nearly their native conditions than the cool, moist summer air of the British Islands.

SELECTING NORWAY SPRUCES.

An intelligent tree-grower, in passing through the spruces on the College lawn in May, remarked: "It is a pity our spruces cannot be propagated by layers or cuttings. Grown from seed, so many of them are dingy and open."

On calling his attention to the fact that the compact, early-starting trees, then covered with crimson buds of rare beauty, were almost purely pistillate, while the dingy open ones, with branchlets covered with powdered resin, were dotted with tiny yellowish-brown male flowers, he expressed surprise that he had never heard or read of this sexual variation before.

It may be that many of our readers will be benefited by learning that the early-starting spruces in the nursery, when you go for your lawn trees in May, are the ones that, with good treatment, will develop into robust, close-habited specimens, with pendant branches graced each recurring spring with the beautiful crimson buds.

This idea applies to the selection of many of our monœcious and dioecious trees and shrubs. We can only add at this time that in selecting the Norway spruce, as grown in our dry, prairie air, while the earlier ones to assume the garb of beauty so difficult to describe, are quite sure to permanently remain almost perfectly pistillate; yet a large share of the less forward will prove more suitable for taller-growers in the background where they will develop into regular monœcious

Digitized by Google

character as to sex and cone-bearing. But the decidedly late-starting, open, dingy, brown specimens of the prairie nursery, the planter should avoid buying, or receiving as a gift. As a rule they will grow rustier, browner, and thinner as they attain age, and will rarely produce a cone or a pistillate flower.

PEACH-GROWING IN IOWA.

In a paper read at the last annual meeting of the Horticultural Society, the belief is expressed that we yet would grow peaches profitably on our northern prairies. Several inquiries have been received relative to this subject. Recent correspondence and investigation only confirm the belief then expressed. The argument is brief. Peaches are grown in interior northern China. Even as far back as the thirteenth century, Marco Polo records, "There are peaches also in their season, both of the yellow and the white kind, and of a delicate flavor." Williamson, in his account of recent exploration in northern China, speaks repeatedly of their peculiar looking peach trees, loaded with fruit of various grades of excellence. We also learn from Russian correspondents that peaches of rather inferior quality are grown in the extreme northwest province of China. So far as tried, all the products of interior northern China succeed famously in our dry and hot summer air, and endure our winters without injury. If the varieties of the peach we import from this region prove inferior in quality, we yet have the advantage of possessing a hardy parent stock from which improved varieties would soon originate under skillful management. We are arranging for an importation of peach pits, which we expect to receive *via* San Francisco, the last of November.

RUSSIAN TRANSPARENT APPLE.

In a note just received, Charles Downing asks if we have imported from Moscow the apple grown in England under the above name. Dr. Hogg describes this variety: "Fruit large, somewhat oblate, ridged at crown; skin smooth and shining green, with russet dots; tender, juicy, pleasant, sub-acid, with pleasant aroma. It bears a never-failing crop in the north of England. It is said to have been brought to England by General Boucheret, in Bonaparte's famous campaign."

We have imported several with this name, as the Red, Gray, Green, and Yellow Transparent. The description corresponds with the one

Digitized by Google

imported under the name "Skwosnoi Selennoe," which proves a fine grower here, with very large, thick leaves.

WHITEWASHING FRUIT TREES.

In the Iowa Horticultural report, for 1878, is given the experience of several parties favoring the idea that even the Transcendent crab will never blight if its trunk and main limbs be kept covered with a lime wash during the summer. We now have a card from a leading editor of Webster City, saying that crabs grown there, including Whitney's No. 20, have blighted this season, though whitewashed in the spring. This question should be better understood. Mr. C. C. Cook, of Cedar Rapids, reports that he has practiced whitewashing his Transcendent crab trees twice each summer, and that he is not troubled with blight, while trees in adjoining premises are ruined by it. But he does not claim that whitewashing in May will prevent blight in June of the same season.

If the lime coat lessens or prevents blight, we believe it is only in the way of lowering the internal temperature of the tree during our intense heat of late summer. Exposed to the sun, a whitewashed stick of wood or piece of iron will not become heated as will dark colored specimens with the same exposure. We do not say that a lime wash will in all cases prevent blight, but we do say that it is not fair to pronounce the plan a humbug if it fails to lessen the June blight by applying the wash only a month previous. If Transcendent trees, or any kind of apple trees, have blighted, standing in ordinary exposures as to solar heat, when annually coated with the lime, as practiced by Mr. Cook, we hope the cases will be reported.

LIMA BEANS WITHOUT POLES.

The Lima bean is less grown than it should be on account of its supposed uncertainty, tenderness, and the trouble connected with poling. Some experiments of ours with this most delicious of all beans may be of public interest. We find by trial that poling is not only unnecessary but decidedly a disadvantage. When the tendrils begin to start we nip them off. Two or three times after this we go over the vines clipping off the climbing tendrils. The plants become low and bushy and loaded with early maturing pods.

In connection we will state that we have Lima beans varied in color, habit of growth, and time of maturity, by crossing with Early Mohawk

Digitized by Google

and Horticultural Pole. We selected last spring from varied colors enough beans of uniform light-pink color to plant an isolated row. We do not find the color uniform in the product, yet a majority of the pods follow the seed planted in size and color. By repeated selection we do not doubt the variety will become established. In this way we can beyond doubt modify any of our fruits or vegetables not quite meeting our climatic conditions.

COLOSSAL ASPARAGUS.

A correspondent asks if we have plants of Colossal asparagus for sale, and that we should give the best time and method for startihg a bed for family use.

We have on the College farm a bed producing a great quantity each season of large and tender shoots. But we have no reason to think that its fine size and yield is due to special variety. With the same care in management we have never failed to secure shoots of equal size and quality, irrespective of the source of our seed or seedlings, yet it would seem that there is room for improvement of this luscious and healthful esculent. In the best beds we have seen, a large per cent of the hills produced only late-starting, tough, attenuated shoots of little, if any, culinary value. We have suspected these unsatisfactory hills to be pistillate plants, as they rarely produce fruit, and in cases where isolated strong shoots bear fruit we can easily believe that two or more seedlings have been planted, as is often the case. However this may be, the practically dicœcious character of our cultivated asparagus presents an obstacle to improvement by seedling production.

In starting a plat, secure from your nearest nurseryman one year old seedlings. Set on heavily-manured, deeply-cultivated soil, two feet apart in the row, with rows four feet apart. Cultivate well, and cover each fall with manure. After the third year the size, quality, and quantity of the sprouts will astonish those who have grown a few plants in sod-bound borders. After the third year, little culture will be needed, especially if a heavy coating of refuse salt be sown over the bed each spring.

INFLUENCE OF STOCK ON SCION.

Several years since, the Miner plum was recommended as a stock on which to top-work the Lombard and other less hardy varieties. Recently we have received several assurances from practical fruit growers that while their root-grafted Lombard trees were dead or dying from

Digitized by Google

the effects of recent severe winters, some grafts on Miner stocks were hale and hearty and bearing fine specimens of fruit.

The Miner is such a rampant grower, and so fixed in its habit of early and perfect maturity of wood in autumn, that we can easily believe that it may influence the habit of ripening of less vigorous varieties worked upon it. We also have some reason to believe the Miner a valuable stock on which to top-work the Morrello cherries, but of this we will speak after further observation and experience. We are glad to record that in all parts of the prairie States, experiments are inaugurated for testing the comparative behavior of half hardy varieties worked on iron-clad stocks. While a few theorists assure us that the stock is only a medium of support to the scion, and that the habit of growth, maturity, size, and flavor of fruit of the latter can in no way be influenced by the stock, our close observing fruit growers are awake to the fact that deep-rooting varieties, noted for inherent capacity to bid defiance to summer heat and winter cold, such as Gros Pomier, Oldenburg, Plumb's Cider, and Wolf River apples, and the Miner plum, actually do influence not only the hardiness and thrift of the scion, but the size, flavor, and quantity of the fruit. For the benefit of those who have not given the matter attention, we give an extract from a letter now on our table, from E. R. Heisz, of Floyd county. "I never had any luck in growing Jonathan, Dominie, Grime's Golden, and Seek-no-further on their own stems, but a few years ago I grafted some of these tender sorts on Duchess and Plumb's Cider stocks and they are doing and bearing well." We could give many pages of such evidence.

MIXING OF VARIETIES OF THE TOMATO.

A visitor at the College recently was admiring the perfectly smooth and beautiful specimens of the Acme tomato. "It is a pity," said he, "that all these fine new varieties run out so soon. My Hathaway and Trophy tomatoes were fine last year, but this year they are rough and very irregular." "Where did you get your seed last season?" we inquired. The reply was "from Vick." Further inquiry elicted the fact that he had grown them near several of the older varieties; and of course we assured him his Hathaway and Trophy tomatoes this year were spoiled by mixing in the blossom. Very few think of this important matter of keeping pure seed. If you are so fortunate as to have the Acme tomato, select your seed as far off as possible from any other variety.

Digitized by Google

UTILIZING THE WHITE THORN.

From a report on forestry planting received from Cherokee county, we extract the following:

In 1875, I think, I attended a meeting of the State Horticultural Society, held in Des Moines, and listened to the discussion on growing the pear on thorn roots. I gave it little attention at the time, but since I have seen a tree in Carroll county, Illinois, top-worked on a seedling thorn coming up in a garden, loaded with luscious pears. The same fall I gathered a bushel of thorn apples and planted in my garden, hoping to get some seedlings to graft the pear on and also try for hedge. But not a solitary plant has yet appeared. How do you raise the seedlings? Is it best to graft or bud the thorn? I have one plant alive out of several I took up on the creek bottom and planted.

This is a more important list of questions than, at first thought, would be apparent. In this State, as well as in Wisconsin, Illinois, and Indiana, we have many vigorous pear trees, bearing bountiful crops which are worked on thorn stocks. In some cases the trees were crown-grafted on small plants; but the majority of the successful trees have been top-grafted entirely above the ground. In all cases, however, when the stock has united perfectly with the graft and kept very nearly even pace in growth, the stock has been a thrifty seedling, springing up where grafted, or else the seedling thorns have been grafted or budded in nursery and transplanted when of small size. All attempts at grafting or budding trees transplanted from the forest, have resulted in imperfect uniting of graft, and feeble growth. Practical tree-growers would expect precisely this result.

Thorn apples planted whole in garden soil will never germinate the first season, and rarely will one appear the second or third year. If the apples be mashed, mixed with meal, and fed to cattle or sheep, and the dropping be planted, about every seed will germinate as readily as corn. Four or five years since, the writer had a wagon load of thorn apples gathered by shaking down on canvas. They were run through the mill for pulping cider apples, and the seeds washed from the pomace and kept over one night in a warm solution of sulphuric acid. As to the limit of strength of solution which the hard shelled seeds will bear, we are not yet advised. One quart of the acid in twelve gallons of water, seemed to soften the seed covering, with destruction of very few of the seeds. After the soaking, the seeds were mixed with sand in boxes and placed in cellar until cold weather, when they were put out on the north side of a fence to freeze and thaw as it

Digitized by Google

happened. Planted early in spring, nearly all grew. Plant several seeds at every point where a pear tree is wanted. If several grow, save the most vigorous specimen. Top-graft the second or third year, not more than three feet above the ground. Graft very early in spring, making diagonal cut to receive scion, precisely as successful fruit growers graft the cherry and plum.

APPLE-TREE BLIGHT.

The unusual prevalence of this disease the current season brings us many queries as to its cause. Correspondents west of the divide report extended and ruinous losses in nursery and orchard. For instance, L. D. Frost, of Cass county, reports his two-year old nursery trees "looking as if fire had run through them. The most of the trees are dead, root and branch. When the diseased condition was at its worst in June, an unpleasant odor was wafted on the breeze to a considerable distance. The grafts planted last spring are all right. An older nursery, somewhat neglected, and covered last season and this with a growth of weeds, is but little affected. I have thought it possible that too rapid growth had something to do with it, but if so, why do our orchards in blue grass sod blight so badly? The crabs were the first to blight. Please give us such light as you can."

On page 168 of the Iowa Horticultural Report for 1877, the writer presents the results of long-continued observation and experiments, supporting the idea that our excessive heat of soil and lower beds of air in orchards on dark-colored, exposed soils, is a probable cause of this and other orchard troubles. The French gardeners talk of "*coup de chaleur*" (stroke of heat) in connection with apple, pear, and plum trees becoming diseased, when standing on the sunny side of high walls where the reflection of the sun's rays creates an abnormally high temperature within the tree. The great French physicist, M. Becquerel, records as the result of carefully conducted experiments, that an internal temperature of the plum tree of 98 degrees Fahr., in August, when the cells of the newly formed wood-deposit are becoming solidified and freed from watery particles, always results in diseased condition of the tree, and usually in death within a short time. In other words, he found that a temperature of sap-wood exactly favorable to most rapid growth of semi-tropical plants, would produce disease in, and death of, trees indigenous to the north. We also agree that our varieties of the apple from Siberia, and their crosses retaining the Siberian form,

Digitized by Google

are first to exhibit traces of the blight. They are capable of enduring our test winters, but they know nothing in their native country of our summer-heat of soil and air. The varieties of the apple we receive from the interior of Russia, with the thickened epidermis of leaf and bark developed in the course of generations, by their dry, hot summers, are less subject to blight, even in positions where they must endure a temperature some higher than is natural. Our varieties imported from England, or other portions of southern Europe with cool moist summers, as we might expect, are variable as to their capacity to endure our summers or our winters, just as their structure is varied by their origin.

The idea is perfectly illustrated by the varieties and behavior of the wheat plant in various portions of the world. In more equable and regularly humid climates, the forms of disease engendered by our arid summer heats are unknown, while at Xalapa, Mexico, "wheat will not mount into ear, but produces a low-growing grass." Lindley lays down the axiom in horticulture, that "all plants require the soil as well as the atmosphere in which they grow, to correspond in temperature with that of the countries of which they are native." Yet, he devotes a large part of his "Theory and Practice of Horticulture" to the means at the command of the gardener for the modification of natural conditions of soil and air by artificial means.

In our orcharding we cannot modify soil and air conditions as we do with glass structures, shading, etc., with our flowering plants, but by selection of varieties, position, and treatment of surface soil of our orchards, we can control the summer temperature of our trees sufficiently to exempt us from serious trouble in the way of blight. As an instance of surface modification, Dr. Ward, of New Jersey, a number of years since commenced the plan of cultivating his pear orchard early in the season, and covering the whole surface with marsh hay in July. His orchard has since borne fine crops and been very nearly exempt from blight. His neighbors, following his example, have had equal success, while the skeptical ones, having other theories in regard to the cause of the disease and keeping on in the old way, have lost their trees. Thomas Meehan, while believing and teaching that blight is caused by fungus development in the tissues, yet for many years has continued to point out the fact that wherever he has gone, east or west, apples, pears, peaches, raspberries and plums, that "have somehow got out of the ruts of what is sarcastically called cultivation, and

Digitized by Google

into some happy spot where they can push their roots on a nice, cool, shaded, and regularly humid surface," are uniformly healthy and productive. We can only summarize our prairie experience by saying:

1. Apple trees blight least on light-colored soils, in elevated, airy positions.

2. We find a wide range of varieties to fatally blight on dark-colored, exposed soils, in sheltered positions.

3. We find the disease confined to few varieties, and to assume less serious form, in orchards with surface shaded in August by a succulent second-growth of clover.

4. We rarely find a blighted twig in an orchard or nursery with its surface covered the preceding season by a thick growth of buckwheat.

5. We note little blight in orchards where a coating of weeds and rubbish are lightly turned under in June, followed by a growth of succulent weeds in July and August.

6. Orchard trees kept whitewashed on the trunks and main limbs during the latter part of the season's growth rarely show traces of blight.

In all these cases we can readily trace the cause of blight to unnatural heating of the internal structure of the trees during the season when the newly formed wood and inner bark are maturing. Earlier in the season the forming cell-structure is loaded with fluids and seems little affected by excess of heat. We have neither the time nor inclination to speculate on the exact manner in which an internal temperature of 95 to 98 degrees works injury to the maturing cell-structure of the English Golden Russet or Transcendent crab, while an internal temperature of 120 degrees may not injure an orange or a fig at the Cape of Good Hope. We fully believe the damage is done at the time and in the way indicated. If the damage is specially severe, the visible results may appear in patches of discolored bark the same season. But almost as a rule the sap ascends in the wood of the older growth, as it will do in rabbit-girdled trees, and the trees make about their usual extension of apparently healthy growth. Earlier or later in June, according to the season, the time arrives for new wood deposit over the injured cell-structure of the previous August, when the blight appears *just where we may expect it, in the growing points immediately in communication with the forming cambium layer.*

We do not expect, at once, a large number of believers in this simple

Digitized by Google

theory of blight; we only ask that it be carefully investigated. But apparent exceptions must be carefully studied. Trees standing near buildings, surfaces of exposed soils, or with other conditions where an internal heat of 98 degrees may be engendered, may blight if the surface under them be covered with clover, buckwheat, or mulch of any kind. We will only add that an orchard of over 1,000 trees, consisting of 118 varieties, on the College Farm, has had its surface cooled by a crop of buckwheat for three successive years, and not a blighted crab or variety of any kind can now be found. The situation is eminently favorable to blight, and prior to this period of special treatment of surface soil, with intense heating consequent on open exposure to the sun, but few varieties escaped damage by blight in June. The College nursery contains about five hundred varieties, about all of northern parentage, including many of the new crabs of Vermont, Minnesota, and Russia, yet not a single blighted twig can be found. At the time of the last cultivation, early in July, buckwheat is sown to cover the surface during the last of July, and especially in August and early September. We specially select buckwheat as a soil-covering on account of the little trouble it gives, and its peculiar and little understood capacity for maintaining beneath it a cool, moist, friable soil.

PROMISING NEW WINTER APPLES.

We have just been engaged in taking careful notes on some of the newer winter apples of fine size, appearance, and quality, which bid fair to become candidates for popular favor, for culture on the prairies of Northern Iowa. We have trees of all these varieties growing in our experimental nursery. All of them are fine growers, have marked traces of the Russian type of the apple in leaf, bud, and style of growth, and all of them are well ripened up and terminal bud formed at this time, on ground where frost has done little damage. Some of the specimens before us have been grown in this State, some of them in Waupacca county, Wisconsin, and still others in Canada and Vermont.

McIntosh Red—Fruit, above medium size, somewhat flattened, regular, smooth; color, rich red and even purple in the sun; very handsome and of choice quality; much like Fameuse in flavor, but better; season, mid-winter.

Scott's Winter—Tree, moderate grower, with every appearance of standing unscathed our hot summers as well as cold winters; fruit, medium or above in size; color, yellow, striped with rich, dark red. Our one specimen is now

Digitized by Google

as hard as a bullet; said to keep until late in the spring in Vermont, but our hot summers will most likely hasten its maturity.

Magoy Redstreak—This is a model grower in nursery, with thick, firm, large leaves, with the Russian birth-marks all over; an undoubted "iron-clad"; fruit, much like yellow Bellflower in size and shape, but striped on the sunny side; quality, not as good as Bellflower, but a far better keeper.

Balch—Tree, a good grower, with leaf standing well our intense summer heat; originated in northern Wisconsin; fruit, resembling Black Detroit, with ridging and basin much like Winesap; quality, very good; season, January to February.

Adda—Tree, upright, strong grower, good leaf, well ripened up before frost; fruit, medium, very smooth and regular: stem, long, with russeting around cavity; basin, deep and wrinkled; quality, excellent for eating or culinary use; very promising variety.

Weyenwega—A seedling from Canadian seed, originated in Wisconsin; fruit, large, and very much like Willow in shape, color and flavor; tree, a good grower, and likely to prove fully as hardy as Ben Davis, with quality of fruit better.

Wolf River—This has proved an iron-clad in Blue Earth county, Minnesota; very vigorous grower, with very large, thick leaves; fruit, very large and showy, prime for culinary use, but quite acid for eating. Judging from specimens before us, we conclude, if picked early, it will keep until Jannary.

Wrightman Blush—The tree seems perfect in growth and leaf, and we anxiously hope it will prove an iron-clad. The original tree is still hale and hearty in northern Wisconsin. Fruit, very much like Rhode Island Greening in appearance, flavor, and season.

Wrightman—E. R. Heisz, of Nora Springs, Iowa, has fruited this variety, and reports the tree every way satisfactory. The original tree is yet perfect in Wisconsin. The fruit is large and remarkably firm fleshed and heavy. Though much larger, the fruit is much like the Timber Twig, with basin depressed still less than in that variety; a very late keeper, of good quality; should be extensively tried.

Flora—Tree, upright, strong grower, well ripened; fruit, larger than Jonathan, and shaped much like it; decidedly a fine, smooth looking variety; hard now, but fine grained and pleasant in flavor. Originated in Waupacca county, Wisconsin.

Rich's Greening—This is another long keeper, of good size and fine appearance. The tree is somewhat irregular in growth, but ripens up like a crab; stood the winter of 1872-3, in northern Iowa, without injury; the quality seems decidedly good for a long keeper.

Martha—The specimen before us is as large as Bailey Sweet, and much like it in shape; in appearance, it is still more beautiful than the latter; in season, it seems about like Jonathan; for so large an apple, it is remarkably fine grained and excellent; fully as acid as Jonathan; the tree is very upright and promises to be as hardy as Fameuse.

Rogers' Spitzenberg—Originated in Harrison county, Iowa; tree, a fine,

Digitized by Google

upright grower, with perfect leaf; fruit, much like Flushing Spitzenberg; but smaller and a much later keeper; specimens were kept in perfect condition until July; likely to prove an iron-clad.

Excelsior—Another good grower, with vigorious, healthy leaf; fruit, medium in size, sub-acid, and keeps well until spring; originated in Blach Hawk county, Iowa.

Joe Davis—Also a Black Hawk county seedling. The tree is a very strong grower, with Russian leaf; fruit, better than Ben Davis, but will not keep as long.

Wealthy—This iron-clad has been widely noticed, yet it will bear much praise. If picked early, it will keep longer than Fameuse, and the fruit is about same size and quality. The tree is as hardy as a cottonwood, and even more so when grown on the open prairie.

Iowa Russet—This is also a variety often recommended. It is growing in favor every year. The fruit is of fine size and of best quality for an apple that will keep until March. We have not known a tree to be injured anywhere in the State by summer's heat or winter's cold.

Canada Baldwin—The tree gives every promise of extreme hardiness. The leaf withstands the sun like an oleander; fruit, about size of Fameuse, with much the same color of skin and flesh; the flesh is often deeply stained with red; a good keeper, of good quality.

St. Hilaire—This is a Canada seedling of the Fameuse, and much like it in tree and fruit, except that the fruit is larger and free from tendency to scab. It also keeps much longer. Last winter we kept beautiful specimens until the middle of February. It is certain to prove as hardy as Fameuse.

Digitized by Google

Eastern Iowa Horticultural Society.

PROCEEDINGS OF THE TENTH ANNUAL MEETING, HELD AT MUSCATINE DECEMBER 2, 3, AND 4, 1879.

FIRST DAY.

THE Eastern Iowa Horticultural Society met in the rooms of the Muscatine Academy of Science, at 10½ A. M., December 2, 1879, and was called to order by President Foster, and opened with the reading of scripture and prayer, by Rev. Dr. Robbins.

The scripture selection was from Genesis, second chapter, from the eighth to seventeenth verses, inclusive.

"And the Lord God planted a garden eastward in Eden, and there he put the man whom he had formed.

"And out of the ground made the Lord God to grow, every tree that is pleasant to the sight, and good for food; the tree of life also in the midst of the garden, and the tree of knowledge of good and evil.

"And a river went out of Eden to water the garden, and from thence it was parted, and became into four heads.

"The name of the first is Pison, that is it which compasseth the whole land of Havilah, where there is gold.

"And the gold of that land is good, there is bdellium and the onyx stone.

"And the name of the second river is Gihon, the same is that compasseth the whole land of Ethiopia.

"And the name of the third river Hiddekel, that is it which goeth toward the east of Assyria; and the fourth river is Euphrates.

"And the Lord God took the man and put him into the garden of Eden, to dress it and to keep it.

"And the Lord God commanded the man, saying, of every tree of the garden thou mayest freely eat; but of the tree of knowledge of good and evil, thou shalt not eat of it; for in the day that thou eatest thereof, thou shalt surely die."

On motion, Prof. Budd and the Secretary were appointed a commit-

Digitized by Google

tee on programme, and they were instructed to report at the opening of the meeting in the afternoon.

On motion of Secretary Lathrop, the by-laws were changed so as to make our annual meeting commence on the third Tuesday of December, instead of the second.

There being no special business before the meeting, a general discussion was had till the adjournment.

Mr. Mead, of Davenport: I have lived in the country forty years, and my experience during that time teaches me, that our fruit trees need protection to insure fruit and a healthy growth of tree. Care is necessary in plowing and cultivating, as well as in pruning and training the trees. I have seen, and have some knowledge of a patent tree protection, that was on exhibition at the Michigan State Fair. It is used on the harness to prevent bruising the bark of trees when the orchard is being plowed, harrowed and cultivated.

Prof. Budd: Will the calalpa grow well from cuttings?

President Foster: I have grown some in that manner, but last spring I was not very successful in my planting of cuttings. The month of May, and the early part of June was quite dry, and that may have been the cause of my failure to grow them well this year.

Prof. Budd: I have broken off sprouts from the stump of catalpa trees very near or close to the ground, and they did well, but such cuttings will do better than those growing where they become soft and pithy. I have seen the catalpa tree forty years old, and a tree must be hardy to attain such an age.

President Foster: I have had peach trees that stood for years without injury. Have seen Dominie trees that have stood twenty-five years without damage, but these isolated cases do not prove the general hardiness of peach trees or of Dominie apple trees.

The hardy and the tender varieties of the catalpa, can better be known by their time of blooming, than by any other sign. The hardy kind blooms early in June, and the tender kind very late in June or the fore part of July.

Prof. Budd: I have grown in nursery and scattered over the prairies of Iowa, thousands of the young catalpa trees before there was any special interest created in favor of this new candidate. Trees from seed of the same variety will show variations from the parent stock, and this may be looked for in the catalpa.

The society then adjourned till half past one o'clock, P. M.

Digitized by Google

AFTERNOON.

Society met as per adjournment.

The committee on programme reported, and the report was adopted.

The following is the programme:

Tuesday—President's Address; Small Fruits and Gardening; Revision of Small Fruit List; Orchard culture and management.

Wednesday forenoon—Revision of Apple List; Pears; Hedges for South, their cultivation, etc.; Hedges for North, their culture, etc.; Protecting Birds.

Wednesday afternoon — Evergreens; Floriculture; Experimental Horticulture; Meterology.

Evening—Address by Prof. Witter; Essay by Miss Alice Walton.

Thursday—Election of Officers; Cause of the Winter killing of trees; Entomology.

PRESIDENT'S ADDRESS.

Members and friends of the Eastern Iowa Horticultural Society—The time for another of our annual meetings has rolled around. This is the tenth, since the organization of our society, and each succeeding year brings to our notice new plants, new fruits, and a fresh experience. We meet to communicate to each other the knowledge we have gained in relation to these plants, and these fruits, to relate what is new in our experience, to sift the good from the bad, and thus accumulate from and impart to each other valuable knowledge, and make a new advance in our chosen and pleasant calling.

Fruit culture is of very ancient date, but probably no country ever made such rapid and valuable improvements in the art as the people of this country have made during the last thirty years. Now, instead of the small unpalatable seedling apple, nearly every family has the large, luscious, rich grafted fruit. Instead of hunting all day over the wild prairie, and in the dense woods, for a few quarts of wild berries,

Digitized by Google

the improved varieties are gathered by the bushel in our gardens and cultivated fields, our markets are supplied so that all in city, town, and country, can have choice fruit at as cheap a price as any other food, bringing luxury and health to the rich and poor alike.

The art of canning, and other modes of preserving our fruits, will enable them to be carried to all parts of our own country, and to be exported to foreign countries.

In fact, the Atlantic steamers are now loaded with apples fresh from the orchards of our eastern neighbors, which command the highest prices in the markets of London, Liverpool, and other European cities.

While the production of fruit has increased, its consumption has increased equally fast, so that our markets are kept up to a paying standard.

Our boys and girls can find no more profitable, healthful or pleasurable employment than in raising fruits and flowers, and parents would do well to give this subject due consideration, and provide such employment for them. If they could be taught to love it, it would be found a great safeguard against idleness and vice.

We find a general lack of knowledge among our farmers in regard to what trees to plant, and how to treat them when planted, nor did the nurserymen of twenty-five years ago know what varieties were suited to the climate of our northwestern prairies, and to this day our orchards are not filled with a sufficient number of healthy, productive trees, so that for a full supply of fruit we have to depend upon the fruit growing States east of us. In their seasons of plenty, Michigan, Ohio, and even New York to some extent, supply our markets with apples. If we cannot raise apples here as cheaply as they can in Michigan we should in time be able to raise them, so that we can compete with them, with the addition of the freight as a tariff on theirs.

I have about forty acres in orchard, and six acres of this produced this year 240 bushels of Ben Davis apples, which is more than all the remaining thirty-four acres produced. Now, can we estimate the loss to our county that we nurserymen have caused by propagating the wrong varieties? The nurserymen who do not attend our horticultural meetings, and become informed as to the improved and best varieties, ought to quit the business.

Horticulture in its perfection is to the agricultural community in a moral sense what the Sunday-school and bible-class is to the church.

Digitized by Google

It makes the home, when well adorned, look cheerful and happy. To plant trees, raise fruits, and cultivate flowers inclines the younger members of the family to love the home, restrains them from wandering to places less attractive, or seeking the pleasurable haunts of vice. It is helpful and hopeful, and hopefulness prolongs life. To put out trees and look forward to the time when their spreading branches will yield a grateful shade, or an abundant crop of fruit, cannot but be a source of pleasure to those who have the care of them, and watch with every returning season their development.

It is of vital interest to our prairie country to have trees planted, and planted extensively. Their growth checks the force of the sweeping winds, and prevents the rapid drying of the soil. The leaves give off a large amount of moisture, and by these two agencies assist the growing crops more than by increasing the rainfall.

The influence of trees in checking the force of the wind, and giving off moisture from their leaves, is felt in their immediate vicinity, while the rain clouds are high in the air, and their atmospheric conditions are wide-spread and hard to control. We can more easily check the violence of the winds and their drying powers than we can make rain clouds.

The torpid indifference manifested by a majority of our farmers to horticulture and horticultural meetings discourages us, and weakens our energies, so there devolves upon the faithful few the greater need of an increased earnestness in continuing on in our work of philanthrophy and love.

SMALL FRUITS.

Prof. Budd: Among strawberries I place Downer as the first for productiveness, size, and quality, and also in disposition to keep down the weeds, and take care of itself. Next is Green Prolific, if it is well fertilized by some other variety. Downer is a good standard sort to fertilize it. Then Wilson for productiveness and hardiness of plant. Charles Downing is the best in quality of any on the list. Of the newer varieties, first is the Red Jacket, perfect in flower, productive,

Digitized by Google

about with the Wilson in quality. Crescent seedling is a rampant grower, is the lazy man's berry, nearly like the Colfax in taking care of itself and fighting weeds. The Kentucky, as an old variety is a good one, large in size, robust in growth, and late in ripening. It is fine in quality and perfect in flower.

Mr. Mead: I have had considerable experience with the old varieties, ten or more years ago. I determine the merits of a berry by its marketable quality, and for this purpose the Wilson is as good as any. The objection to Dowher's prolific, as a market sort, is that is too soft, does not bear transportation, and loses its color. Green prolific is too soft, but it yields well, and needs fertilizing. The Sharpless seems to promise well. If berries are raised on old ground the plants are apt to be troubled by the white grub. I do not find any sort that will fill the place of the Wilson, and I have tried twenty varieties.

President Foster: The Ida grown on my grounds did well, but grew too close.

Prof. Budd: It is too soft. We have on the College grounds sixty varieties, any one of which is better than Ida. The new varieties need to be well tested before being adopted, and one or two years is not long enough for this test. Most of the new varieties are a cross of some variety of the wild strawberry with the South American species. Crescent Seedling is very near the Colfax.

Mr. Sennett: The best soil for strawberries is an important point.

Mr. Mead: New land is best, and next a sandy loam; light soils are better than heavy ones; moist and well-drained soils are better than dry ones, and wet seasons are better than dry ones. The strawberry is a plant that bears water well, and it takes kindly to good mulching.

Mr. Sennett: In England the hillsides are the places selected for the cultivation of the strawberry, but the climate there is much more moist than ours.

Prof. Budd: The people have not well learned the best process of mulching. I have planted an acre so that the horse cultivators can be used. The rows are four feet apart; the rows themselves sixteen inches wide; they are now covered with a mulch of straw. In the spring the straw will be raked off the plants, and left between the rows for a mulch till after the crop is harvested. The Downer, Kentucky, and Charles Downing, with cultivation, will last four years without resetting, and the Wilson but two or three.

Mr. Mead: In raising strawberries, I plant rows four feet apart,

Digitized by Google

mulch as recommended by Prof. Budd, and cultivate with straddle-row corn plow in the spring.

Prof. Budd: I would not use the plow till after the crop is gathered.

RASPBERRIES.

Mr. Mead: As to the relative profit of strawberries and raspberries, I prefer the latter, as they can be gathered for less expense. I see but little difference between the Mammoth Cluster and the common Black Cap.

President Foster: I have tried them side by side, and I thought the Mammoth Cluster the best. I had rather have one quart of Turner than two of Mammoth Cluster. The Turner raspberry is large, productive, luscious, and good.

Prof. Budd: The Turner is too little disseminated; it is the best raspberry we have in cultivation.

Mr. Mead: After trying many, I settled down on Philadelphia, but it winter-killed too much, and I have concluded to discard it for the Turner.

Mr. Schooley: The Turner is a good berry, but it suckers badly, and cultivation must not be neglected, or the suckers will cover the ground.

On motion, the Davidson's Thornless was stricken from the list.

STRAWBERRY LIST.

Wilson, Green Prolific, Charles Downing, Downer, Kentucky, and Red Jacket.

RASPBERRY LIST.

Turner, Mammoth Cluster, Doolittle, and Philadelphia.

BLACKBERRIES.

President Foster: The Snyder has been planted in this locality, but it has not fruited here much yet.

Mr. Sennett: Mr. Gilbert, a neighbor of mine, has been raising a good crop of berries for several years.

Secretary Lathrop: Thirty years ago the blackberry was the most abundant of any of our wild fruits. There was then scarcely a copse on our prairies, or a half cleared patch of timber, that was not more or less sprinkled with blackerry bushes, from which could be gathered several crops; but now these wildlings have almost wholly disappeared,

Digitized by Google

and it is yet an unsolved problem why we cannot raise them as well under cultivation as they grew in their wild state. It is a plant that is fond of moisture, bears heavy mulching, does well in the shade.

Mr. Gilbert: Mr. Barnard, near this place, has been raising blackberries with better success, and more profit than he has either strawberries or raspberries.

Mr. Mead: Knowing how well the blackberry in its wild state flourished here in early times, and supposing the cultivated sorts would do equally as well, when the Lawton came, I got it and raised one good crop, when it failed. I then got the Kittatinny, and my experience with it was like that with the Lawton. I now have discarded the blackberry entirely.

A motion to strike the Barnard from the list was carried, which leaves the blackberry list a blank.

GRAPES.

Prof. Budd: I move that Moore's Early and Worden be added to the list for trial. I have tasted the Moore's Early and have seen the vine, and I believe it to be hardy. It is black in color. I would not recommend any grape that had a leaf that could not withstand the adverse influences of our summer climate. I would like to see the Worden tried; it is a large, early, delicious grape, hardy in vine and of good promise.

Secretary Lathrop: At the meeting of the American Pomological Society, held in Rochester, last September, no one of the new grapes received so good an indorsement from all parts of the country as Moore's Early, and judging from what I learn of it there, I think it may prove a valuable addition to our list; but, with this, as with all new fruits, we should "prove all things and hold fast only to the good."

On motion, the Ives and Clinton were stricken from the list.

LIST OF GRAPES.

For general cultivation—Concord and Martha.

For autumn cultivation winter protection—Salem and Roger's Nos. 4, 9 and 15.

For trial—Dodder, Moore's Early, and Worden.

The Society then adjourned to meet at 7 o'clock in the evening.

Digitized by Google

FIRST DAY.

TUESDAY EVENING, December 2, 1879.

Society met as per adjournment.
The following paper was read:

THE APPLE.

BY C. P. OSBORN.

Mr. President—The Secretary of our Society has requested me to prepare a few lines upon the apple, for this meeting. The apple has a long history—the pages that have been written upon it may be counted by the thousands, and now what more can be said. Still an energetic, observing student of horticulture is finding something new every year. Now, permit me to pass over much of this history about soils, minerals, climate, etc., of which there has been so much said, and of which there is much to be learned yet. We find as a general thing that fruits are not fond of emigrating.

Mr. Cole tells us that in the State of Maine it is estimated there are over 2,000,000 varieties of apple, and many of them very choice fruits, yet only a very small fraction are known outside of their original locality, and but very few have succeeded where taken to other localities. Only one variety, I think, from that State is growing in Iowa with success (Cole's Quince). The same may be said of most of the other States. This illustrates what I before remarked, that the apple is not fond of emigrating. Have we not been taught a lesson by the failure of most of the old varieties and many of the new, that they prefer to remain at the old home? Now, the question comes up, from whence shall come our future apples? In all of our experiments and investi-

Digitized by Google

gations, who has thrown the most light on this subject to encourage those horticulturists that are still persevering for varieties that will meet the wants of the rest? Some tell us that there are certain traits in the structure of the leaf which it must possess in order to success. Others say the formation cells that are wanting in many of our varieties is *the why* they do not succeed.

I have been trying many of our new seedlings for the past few years of Iowa and Minnesota origin. I cannot speak of them as fruiting with me, but have seen the most of them, but will give my experience and observations of them in the nursery. The De Moine, from James Smith, Des Moines, fruits very fine, but the tree does not give satisfaction here. The Burlington, from Mr. Teller, is doing well; fruit keeps well. Robinson: am well pleased with the trees; received them from Mr. Foster. Leitch and Hills from Mr. Plumb, of Wisconsin, seem to be at home on my grounds; have a good healthy look. Leitch, autumn, Hills, winter. Wates and Martha from Mr. Springer, of northern Wisconsin, appear well; Wates, summer, Martha winter; one of the finest new apples. Wolf River and Wrightman are not doing as well as the above. The Barden, from Mr. Barden, of Wisconsin, is doing finely in nursery; a good apple and a good keeper. The above named apples are some of the seedlings lately introduced, with promise of doing well. I have several others which do not appear as well, but it will take time to prove them in what goes to make them valuable for general cultivation. Now I confess that I do not know enough about wood cells, leaf structure, etc., to tell whether they possess them to such a degree as to make them *the trees* for Iowa or not. I have of late been reading Mr. Gideon's views "on the future trees of the West," and they strike me favorably. I am still of the opinion that we shall reach the desired fruits through a course of seedlings.

DISCUSSION.

Prof. Budd: The Martha is one of the seedlings sent out by Mr. Springer, of northern Wisconsin. Fruit is about the color of the Wealthy; not as good in quality, but as hardy in tree.

Mr. Leitch has several seedlings that are early and late varieties; they are doing well. Wolf River is an iron-clad, also originated by Mr. Springer, in Waupacca county, Wisconsin; apple a late fall variety and tree very hardy. Two of the best northern Wisconsin varieties, Wrightman and Wrightman Blush, are not mentioned in the

Digitized by Google

essay. Mr. Peffer raised Clark's Orange that took the premium at the Wisconsin State Fair, as the best seedling shown for five consecutive years. The Magog Redstreak and Scott's Winter are two apples of promise from northern Vermont; the former a large fruit, and the latter a long keeper. The Winter Fameuse, keeping like the Ben Davis, and Canada Baldwin, are good varieties from northern Vermont, that will probably bear translation to our climate.

Mr. Branson: I saw the Barden at Mr. Osborn's last fall, and I liked its appearance.

Prof. Budd: Wolf River is fruiting well in northern Minnesota.

President Foster: The idea that apple trees do not bear translation, must be taken with many grains of allowance, for we have the Fameuse from Canada, the Porter from Massachusetts, the Jonathan from the east, and the Duchess from Russia.

The following paper on *the influence of stock on scion,* was read by Professor Budd, of the Agricultural College.

INFLUENCE OF STOCK ON SCION.

BY PROF. J. L. BUDD, AMES, IOWA.

This is a topic that has been extensively discussed by practical fruit growers, and even respectable biologists for the past one hundred years. It is beginning to attract attention in the prairie States, and it may prove profitable before noting our limited home experience to take a look at the recorded opinions of close observers in countries with an older record in fruit growing. In doing this we can only summarize the opinions of honest experimenters and observers. Detailed statements would require more space than would be profitable.

The pages of the *Gardener's Chronicle* during the years it was edited by Dr. Lindley are rich in information bearing on the subject.

From a horticultural standpoint this was a peculiar period. The Royal Horticultural Society of England was then engaged in the work of collecting trees and plants from all portions of the world. Robert

Digitized by Google

Fortune, in its employ, spent three years in collecting and forwarding the plants, shrubs, and trees of China. Prof. Hooker devoted several years to the same kind of work in forwarding the plants and trees of our western coast, etc.

For a number of years the demand for these novelties exceeded the supply. Common gardeners became students in botany and vegetable physiology, with a view to hunting up allied species on which the new arrivals might be rapidly propagated by budding or grafting. The *Gardener's Chronicle* became the record of these valuable bits of experience in top-working. Soon correspondents began to report that certain plants not doing well in their locality on their own roots did far better worked on hardy stocks. Thus Prunus lusitanica top-worked on Prunus padus was found to ripen up its wood earlier in autumn, and that it would endure a far lower temperature than when grown on its own roots. Following the same law it was soon found that while the peach stock in the cold soil of England became a mass of gum and canker, the plum stock worked with the peach remained "clear and bright as glass." Varieties of the grape, too, not doing well in the English air, were found to mature wood and fruit better inarched on hardier stocks. In the same way varieties of the rose too tender for their climate did well in growing and flowering worked on indigenous species of vigorous habit of growth. Soon we find in the record of De Jonghe and others that many of the delicate growing pears became vigorous and productive worked on vigorous, hardy stocks.

Dr. Lindley summarized his extended observation and experience as editor of the *Chronicle,* Secretary of the Royal Horticultural Society, and practical horticulturist and botanist as follows:

From what has been stated it may be easily conceived that the choice of a stock on which a given plant is to be worked is by no means a matter of indifference, but that the operation may be seriously affected by the skill with which the most suitable stock is selected. If our only view was the simple propagation of a variety the end would be best attained by using the most abundant stock of the species. The end of grafting and budding is, however, beyond this, and it may happen that the species to which the cion belongs, or the nearest variety, is the worst on which it can be worked. It is sometimes desirable to increase the hardiness of a variety, and budding and grafting appears to produce this effect to a certain extent; not, indeed, by the stock communicating to the scion any of its own power of resisting cold, but by the stock being better suited to the soil of latitudes colder than that from which the scion comes. It is not merely upon the productievness or vigor of the scion that the stock exercises an influence; its effects have been found to extend to the quality of the fruit. This may be conceived to

Digitized by Google

happen in two ways: either by the ascending sap carrying up with it into the scion a part of the secretions of the stock, or by the difference induced in the general health of the scion by the manner in which the flow of ascending and descending sap is promoted or retarded by the stock.

In the light of more recent experimentation and research we can only object to one conclusion reached by Dr. Lindley. The leading climatic drawback in all out-door horticultural operations in England is the low temperature of soil and air during the growing season. When it was found that plants, shrubs and trees from climates with a higher summer temperature would succeed better on indigenous stocks of robust habit, it was very natural to assume that it was brought about by the adaptation of the stocks to the low temperature of their soil.

In the older settled sections of the eastern States a few of the most experienced and close observing horticulturists have confirmed some of the views expressed on this subject by Loudon, Lindley, De Albret, De Jonghe and others. We can only note two or three of these opinions and a few of the reasons why they are entertained.

Josiah Hoopes says: "The very moment that an inserted bud or graft commences to granulate, and then unite, that moment the two parts of the embryo tree struggle, as it were, for the mastery. That is, certain idiosyncrasies inherent in the branches of the one, or the roots of the other, will form a leading feature in the mature plant. Abundant proof of this is afforded by examining roots of nursery grown trees, whether budded or grafted. * * * In some instances the stock exerts a marked influence upon the scion thus showing the co-operative system in use between them."

In illustration he gives instances of the Muscat grape worked on the Black Hamburg, starting six days earlier in spring than its natural time on its own root; of variegation of leaf of scion being communicated to stock, etc.

Josiah W. Talbot in a recent carefully prepared paper read before the Massachusetts Horticultural Society, gives a great number of instances where the character of fruit in size, flavor and color was varied by the variety used as a stock. In several authentic cases the Porter top-worked on very sour fruited stocks become too acid for dessert use. The Sweet June worked on the Red Astrachan becomes a red apple, yet it retained its characteristic sweetness and flavor.

Mr. M. H. Merriam logically assumes that "nothing militates against the theory of mutual influence of stock and scion. The Baldwin has perpetuated itself with much purity, as in the case of ani-

Digitized by Google

mals of fixed variety or race. The value of an animal as a breeder depends on its power of transmission of its characteristics to its progeny. Stocks grown from seed may, or may not, possess this power, but an established race will fix its character on a stock possessing less individuality, and this is a valuable quality in a variety.

W. C. Strong said: "Not only may the quality of the fruit be modified by the stock but in special cases the vigor of growth and the hardiness of the scion is determined by the character of the stock. As a well known instance Magnolia glauca grafted on Magnolia acuminata, will grow to three times its natural size and become far more hardy. I have grown a new variety of Abutilon produced by the modification of the scion by the stock."

Marshall P. Wilder said very pithily: "When we have attained to an exact knowledge of the adaptation of the stock to the graft, *that* will be the perfection of culture."

It will be instructive to note that in England the beneficial effects of top-working theoretically hinged on the adaptation of the stocks to their cold soil. In Massachusetts having no special trouble with the apple in the way of unsuitable soil or air, they discuss the topic from the German standpoint of "ennobling"; in other words, selecting such stocks as will improve the quality and size of the fruit.

In the prairie States it has always been discussed affirmatively by assuming that the hardiness of a variety is increased by the influence of a stock with determinate habits of growth.

We cannot doubt that there is ample foundation for these several claims. In our own State we have evidence that by the selection of proper stock we can grow Dominie or Jonathan on low, wet soils where they would not reach bearing size, root-grafted. We also have much evidence favoring the idea of improving the character of fruit and flower by judicious selection of stock.

But the main utility with us of top-working on such prepotent stocks as Gros Pomier, Duchess, Wealthy, Wolf River, etc., is in the way of fitting the less hardy scion for enduring the temperature of our test winters. In the interior prairie portions of the State we are continually adding to the stock of evidence in favor of this method of propagation of the better grade of winter varieties. We have now before us a letter from E. R. Heisz, of Floyd county, repeating the statement he has often made in our reports that he is certain that he can grow Jonathan, Dominie, and even Grimes' Golden, profitably when top-worked on Duchess and Plumb's Cider. His opinion is en-

Digitized by Google

titled to much weight as he is old as an experimenter in northern orcharding, and his trees of these varieties, now in bearing, passed unharmed through the noted test winter of 1872–3.

C. G. Patten, of the same county, who reports that on his grounds even the Gros Pomier is not entirely hardy, assures us that the Willow and Roman Stem prove hardy on the Transcendent crab, and that Grimes' Golden on the Duchess grows finely and looks well.

Even on the most favorable fruit-soils of Polk county, James Smith reports in our last annual volume: "I will here throw in the remark that no variety known to me approaches the Jonathan as a winter fruit when it is top-worked on a good hardy stock. My Jonathan trees worked in this way have produced double the quantity of fruit given me by root-grafted trees, in the first twelve or fourteen years after setting. My experience with the Willow is also in favor of top-working."

We could fill dozens of pages with cumulative evidence of this kind. We have purposely omitted our own extended experience in top-working in nursery and orchard. The subject has been one of our hobbies, and it was thought best to take a general survey of the question as a support to the views held by so many of our experienced orchardists.

If the view be well founded that the stocks of very hardy early maturing varieties will give us orchards of long-lived and productive tops, of such varieties as compare favorably with the best Michigan fruits, it should be kept continually before the people. The additional cost and trouble of starting an orchard in this way amounts to less than the uninitiated would suppose. Two-year old Gros Pomier, Duchess, Plumb's Cider, or Virginia crab trees, will be just right for top-working the succeeding spring. A man and boy will easily top-work three hundred trees in a day, putting one scion in each stock.

We have the best success by inserting the scion by the plan known as side-grafting. The top is nipped off with pruning shears just above the joint of insertion, and the wound is covered with a coating of white rosin, with just enough of linseed oil added to make fair chewing gum. The wax is kept warm in a dish over a kerosene lamp, and is applied with a flattened stick. At once, while the wax is yet soft, a bit of white cotton rag is wrapped over the wax. This is the only tieing needed. A careful boy will wax and cover the points of union as fast as the grafter can prepare and insert the scions. If the scions are in good order and the work is done just as the sap commences to start,

Digitized by Google

not one in one hundred will fail to make a vigorous growth. Last spring we inserted grafts in this way which had been on the road from Moscow, Russia, over four months, and scarcely one failed.

DISCUSSION ON PAPER.

Secretary Lathrop: Admitting that stock and scion have a reflex influence upon each other, or that the stock has a prepotent influence on the scion, can we infer that this influence extends to and affects the quality of the fruit? As an instance, take the Baldwin apple as it has been propagated by continuous grafting and re-grafting on seedling stocks. Is not the fruit in character and quality to-day, what the Baldwin apple was, grown on its native seedling stock? The Early Richmond cherry, top-grafted on the common Morello, on the wild plum, and on the Mazjarn stock, has come under my observation, on my own place, and I can see no difference in the inherent quality of the fruit, as grown on the three stocks. But the grafts on Morello will produce a greater number of cherries, while the grafts on the two other stocks will produce cherries of larger size.

Mr. Branson: The Nonpareil is an instance in which the top-worked tree is hardier than the same on its own roots. Would work Grimes' Golden on Nonpareil, and I would always top-graft the Willow on something else to get better tops and more symmetrical trees.

Mr. Schooley: Top-worked trees have always done well with me. In putting out a new orchard I would top-work nearly everything, except the iron-clads themselves, on some hardy stock.

Prof. Budd: In this paper a general view of the whole question is intended, including the relation to and influence of stock on scion, as well as scion on stock. We have found that certain stocks are prepotent, and these prepotent stocks are the ones we want to use. Jonathan on Gros Pomier ripens its terminal shoots better than on its own roots.

Secretary Lathrop: In the spring of 1865 I put out four hundred trees, selected for their hardiness, and they have all been top-grafted. Those top-worked with Rawle's Janet and Dominie are now losing their tops, while the stocks are still sound and healthy. Those top-worked with Ben Davis, Fameuse and St. Lawrence are sound in stock and graft.

My experience teaches me that we cannot here successfully top-graft old trees as they can in some of the older fruit-growing States; we

Digitized by Google

must have vigorous, thrifty young trees for stocks. I tried top-working the Tetofsky on some old Bellflower trees, but the grafted limbs would die in a few years, with the scion in a good condition up to the time the old stock perished.

Prof. Budd: In our State top-working is different from the same work in older States, where the climate is not so dry. Spring budding is sometimes practiced in Europe, but the scions or cuttings from which the buds are taken need to be in a good condition when this is done. Scions can be kept a long time without injury if well protected, and their buds will retain their vitality. I got scions from Russia that had been four months on the way, and they nearly all grew.

Mr. Mead here exhibited a tree-protector, which was an attachment to the tug, to prevent injury to the body of the tree by the single-tree, and explained its working. He would head trees high; we have been branching them too near the ground. Low-headed orchards cannot well be cultivated after the trees attain much age.

Society adjourned to meet at nine o'clock to-morrow morning.

Digitized by Google

SECOND DAY.

WEDNESDAY, DECEMBER 3, 1879.

Society met pursuant to adjournment, and was called to order by the President.

REVISION OF APPLE LIST.

Prof. Budd: Early Joe should always be top-worked, because as a young tree it is always small and inferior. It should be retained on the amateur list, for it is one of the best dessert apples, none better than it when eaten direct from the tree.

Dr. Weed: Have had some experience with the Tetofsky; had it fruit in the nursery row; never had but one orchard tree of it, and that was severely pruned to get scions.

Prof. Budd: About the time the Oldenburg was introduced, the Tetofsky came with it, and by peddlers was very considerably disseminated at high prices, and it is not worth raising as an orchard fruit. The Yellow Transparent is one that is gaining a reputation as a valuable early apple. The Fourth of July is a fruit almost identical with the Tetofsky, and it has been sent out as that variety; but it is a straight, upright grower and a better tree.

Mr. Stewart: Is not the Tetofsky inclined to be water-cored?

Mr. Branson: Mine are to some extent.

On motion, the Tetofsky was stricken from the list.

Mr. Stewart: Sops of Wine has done well with me; very early and fruitful; the earliest variety I raise.

Prof. Budd: In the interior of the State, Williams' Favorite is often grown under this name.

Mr. Stewart: The apple I have, under the name of Sops of Wine, is almost if not quite sweet; not a good cooking apple, and rather soft.

Mr. Branson: I have seen the Sops of Wine at Iowa City, and that was not a sweet apple.

Prof. Budd: When the Oldenburg was first introduced, I paid one hundred dollars for one hundred trees, for the purpose of getting scions. This apple can be gathered early, and it will ripen and color

Digitized by Google

after being harvested, and the fruit will then keep a long time, for so early an apple.

Mr. Branson: The Oldenburg is a good apple to hang upon the tree, better than most early sorts.

Mr. Mead: It has a long season; the crop does not ripen all at once, as some early apples do.

Mr. Branson: It is a good variety for canning.

FALL APPLES.

Mr. Mead: Maiden's Blush did well with me this year; it has generally borne when most others have failed.

On motion, the Chenago Strawberry was stricken from the list, for the reason that it is too soft and thin-skinned to bear marketing; bruises too easily.

Prof. Budd: There is more money in the Gros Pomier as a market apple than it has credit for; it is so good a tree, so early a bearer, and so showy, that it will always be profitable. It should be well ripened before being used.

Mr. Mead: Fameuse is a good market apple for Davenport; always sells well, though the quality is not first rate.

Dr. Weed: Fameuse and Benoni can be picked just before they are ripe, and they will ripen and color after being gathered.

President Foster: Fall Orange has done well with me, seemed to increase one-half in size after beginning to color.

Prof. Budd: I regard it as among the unprofitable sorts. Utter's Red is promising to be a valuable variety; it is a fall apple of good quality, and it has been disseminated under various names: in the Missouri valley as Fameuse, in Benton county as English Janneting, and in Mahaska as Seever's Red Streak. The original tree is now fifty years old, and it is still sound and healthy.

Mr. Branson: Mr. Osborn, of Fairfax, in Linn county, has it in bearing, and in Cedar Rapids it is one of the best market apples of its season.

Prof. Budd: Plumb's Cider is a fine, showy apple; has been grown in Wisconsin thirty years, and the trees are adapted to all climates; can be kept as long as Jonathan, if gathered just before or at the time of ripening. Belle du Havre is a good fall apple, and worthy of dissemination.

On motion, Fall Orange was stricken from, and Plumb's Cider was added to the list.

Digitized by Google

WINTER VARIETIES.

Mr. Mead: Talman Sweet has been a good tree, but my trees are now getting old, and the fruit on them is not now as good as it used to be. I should like a better winter sweet apple.

Dr. Weed: We cannot educate the western people to use sweet apples, and, therefore, very few sweet apples should be raised. I once sold half a car load to a shipper, who took them to Chicago, but he could not sell them there.

Mr. Mead: I have a good crop of Russet apples this year, but I do not regard them as a profitable variety. They do not keep well.

Prof. Budd: If gathered promptly at maturity or a little before, they will keep very well. The Walbridge has a good reputation where it has been raised; it is an old sort in some localities, the original tree being over half a century old.

Mr. Schooley: I have the Bentley's Sweet; it is a good bearer, and a good keeper, but the trees are tender; its flavor is not very good, and the flesh is rather tough in texture.

Mr. ———: I have a dozen or more trees and they have overborne, and from that cause they are dying; it is a good baking apple, and a long keeper, have kept them till July and August.

Dr. Kulp: The quality of an apple is one of the most important things to be considered in the planting of an orchard. If apples of a choice, aromatic flavor can be raised with equal ease, we do not want those of a vapid and almost tasteless quality. In fruit we want something that pleases the palate, as in flowers we want something that is pleasing to the eye. It seems to me, we need a descriptive list to go with our list of apples, that will show more in detail the character, season, quality, etc., of our apples, as a guide to those who are planting orchards, and are not well acquainted with many of the varieties that are most worthy of propagation.

Prof. Budd: In Michigan, Dr. Lyon raised this question, and they have gone over this ground there, and prepared a table which shows all the facts necessary to be known in regard to all the fruits embraced in their recommended list. The Belle De Boskoff, a choice winter variety, is one of the coming apples. Shuck's Red June is an apple of promise, very much like Benoni, better in tree and probably better adapted to our prairie soils.

Digitized by Google

APPLE LIST, AS ADOPTED.

Summer—Oldenburg, Red Astrachan, Benoni, and Early Joe, top-worked.

Fall—Maiden's Blush, Bailey's Sweet, Dyer, Gros Pomier, Fameuse, Lowell, Porter, Utter's Red, Wealthy, and Plumb's Cider.

Winter—Jonathan, Talman Sweet, E. G. Russet, Janet, Iowa Blush, Ben Davis, Willow, Walbridge, and Lansingburg.

For trial—Iowa Russet, Goff, Sheriff, Black Annette, Shuck's Red June.

PEARS.

Prof. Budd: I have the Chinese Sand pear growing, and it has never been known to blight. In quality it is worthless as a dessert fruit, but as a cooking pear it is valuable. It is hardy in tree, as shown by last season's growth, for the terminal buds are perfect. In fruit and leaf it does not resemble our common pears, as the fruit is orange-shaped, and the leaves are longer and more serrated.

Mr. Mead: All my first planting of pear trees perished fifteen years ago. I have since got sixty from Bloomington, Illinois, and forty of them are living yet, and I have raised pears both to use and sell, and for what I sell I get from three to four dollars per bushel; and my faith in pear culture is so strong that last spring I put out three hundred and fifty more trees. My favorite varieties are Duchess D'Angouleme, Flemish Beauty, Clapp's Favorite, Howell, White Doyenne, and D'Anjou. My location is at the foot of the Mississippi bluffs, near Davenport.

Prof. Budd: Henry Avery, of Burlington, has the Crassane Bergamot pear growing in his grounds, and it is perfectly healthy, never having blighted.

Dr. Kulp: My gardener noticed a pear tree that had blight commencing upon it, and he cut back all the new growth to within an inch of the old wood, when the blight ceased and the tree made a new and healthy growth the same season.

On motion, the Crassane Bergamot was added to the list for trial.

LIST, AS ADOPTED.

Flemish Beauty, Seckel, Osband's Summer, and D'Anjou.

For trial—Clapp's Favorite and Crassane Bergamot.

The Society then adjourned to half past one o'clock.

Digitized by Google

AFTERNOON.

Society met as per adjournment, and was called to order by the President.

The subject of hedging being the first subject on the programme, Secretary Lathrop said: The planting and care of hedges is much better understood now than it was several years ago, and where well cared for, the Osage Orange makes so formidable and durable a barrier to stock, that it is singular that it is not more generally used, where permanent fences are wanted. If they can be pruned twice a year, before the new growth is too hard and woody, the pruning can be easily and speedily done.

Mr. Schooley: I prune my hedges in June and September. The effect that this semi-annual pruning has on the plant, is one that has been somewhat discussed. After a hedge has become well established, summer and fall pruning does not seem to affect it injuriously.

Dr. Kulp: Has the barberry been tried for hedging?

Mr. Branson: There is a barberry hedge of several years' standing near Tipton, in Cedar county, and it is a perfect barrier to stock.

Dr. Kulp: Mr. Gregory, of Marblehead, is of the opinion that it will be very generally adopted at the east, as a hedge plant.

Mr. Mead: One serious objection to hedges is that they cannot be made hog proof, there are too many holes and weak spots at the bottom, that cannot easily be stopped. Barbed wire fence is taking the place of hedge, and it is a good stock barrier.

President Foster: The great fault in not having the hedge hog proof, and a perfect fence, is want of care in training. It must receive due attention from the time of planting till it becomes a perfect fence. It is related of a youngster that was an exquisite in dress, that he arranged and wore his neck tie in the very highest of fashionable style, and on being asked how he was enabled to do it, replied, "I devote my whole attention to it." Now the hedge during its few first years, wants a little of this "neck tie" attention. The cutting back of the plants at two or even three years of age is wrong; let them get well established, and then they can be plashed low or severely pruned without injury.

Digitized by Google

Mr. Mead: We cannot cultivate as near to the hedges, as we can to the fences.

Mr. Strohm: I have a hedge between my vineyard and the highway, and I can cultivate as close to it as I can to a board fence, but in pruning the side branches that would interfere with close cultivation are cut back very short. I prune twice a year.

President Foster: I can prune with a corn knife, better than with anything else. A pair of leather mittens on the hands, will protect them from the thorns, and a pair of old boot legs drawn over the arms will protect them.

Prof. Budd: My honey locust hedge in Benton county, is still a good one, and it has been a long time planted. The locust roots deep, and it is not as exhaustive on the soil as the willow.

Mr. Branson: I have a hedge of locust that is becoming less and less thorny as it grows thrifty.

Prof. Budd: If the same care should be bestowed on hedges here as in England, our hedges would be as good as theirs. The buckthorn will make a good hedge, but it is a plant slow of growth. Very good ornamental hedges can be made of barberry, and American arbor-vitæ, by close planting and short pruning.

BIRDS USEFUL AND DESTRUCTIVE.

Mr. Schooley: The small speckled woodpecker has, I think, been useful, in catching the codling moth. He is a different bird from the sap-sucker, although he looks very much like him. He also takes out the flat-headed borer from the body of the tree.

Dr. Weed: Some years ago I noticed the sap-sucker quite closely, and he seemed to be after the sap, as there were no worms or signs of any where he was boring.

Mr. Mead: While domestic fowls may be of use in destroying some insects, they will not devour the plum curculio.

President Foster: There are quite a number of English sparrows in the streets of Muscatine. In the east they caught the cabbage worm in a plantation, and were the means of saving the crop.

Secretary Lathrop: The English sparrow is more of a grain, than he is an insect eating bird, and the English farmer has no friendship for him.

Dr. Kulp: Some German sparrows were imported and taken into the country near Davenport, but they soon quit the country, and took up their residence in town.

Digitized by Google

GERANIUM OR PELARGONIUM.

BY SAMUEL BOWERS, OF CEDAR RAPIDS.

Mr. President—The Geranium or crane's bill, is a native plant growing indigenous all over North America. The Pelargonium or stork bill, that beautiful plant we cultivate, is a native of the Cape of Good Hope and Australia. The adopted name Geranium is so common, and so generally understood that we shall use both names for the same plant. Custom and past events make laws. And logic will name plants and objects, no difference what our scholars do say to the contrary. Florists usually name those plants Pelargoniums that have their flowers variegated with several colors, and bloom only once a year. The same plants are often called Lady Washington Geraniums. And these plants that flower perpetually, including all the fragrant leaf varieties, are called Geraniums. They are both in one botanical order, but the Pelargoniums are a large genus of plants embracing over 300 species and an innumerable number of varieties. Our florists are continually improving them, and adding new varieties to the list. Their flowers are compound, umbel-shaped, on long peduncles, with five or more petals on each floret, the stamens or anthers in the single flowers are ten, sometimes the anthers are white in scarlet flowers, though they are always scarlet in white flowers; the petals stay on the pericarp until the seed is ripe. The pericarp or seed pod is a long beet-looking pod, expanded at the base when the seed is matured, looking much like a stork's bill. Now let us study the plant and see how rigid Nature's laws are with it. We have flowers of brilliant scarlet, lovely pink, and pure white, with an innumerable variation in their leaves and their dissimilar and delightful fragrant leaf, but there she stops. No care or skill the florist can elucidate will make the Geranium produce a bright yellow, or a clear blue flower. And so it is with many other flowering plants, their colors are controlled by natural laws that art cannot alter.

Digitized by Google

CULTIVATION.

I am writing this article just to please our honorable Secretary. Because I suppose every body knows how to grow Geraniums, and that they know the difference between a rose-scented, a lemon-scented, and a horseshoe Geranium. They are propagated either from seed or slips. Sow the seed in a box in a warm room, like any other small seeds, and when the plants are large enough plant them in small pots. Though seedlings are not all good blossomers, there may be one seedling in twenty that will be worth cultivating. The best way is to propagate good varieties from cuttings or slips. At any season in the year when young plants are needed, cut the terminal shoots from the branches about four inches long, and pinch off the bottom leaves of the slip; plant them in shallow boxes previously filled with river sand; keep the sand just moist and in a shady, warm place; they will root in three weeks; then plant them in small pots.

Florists always plant young plants in small pots at first, because if they were to plant a Pelargonium into a full sized pot, either plants from the cutting box or those that are dug up, cut back, and root-pruned, the young roots would all work out to the outside of the pot, and then they would coil around the usual way, so that whatever the size of the pot and ball of earth might be the roots are feeding in a great measure only on the outside of the ball of earth; whereas, by the use of small pots, and progressive shifts, the roots must be feeding in all parts of the soil at once. Try this plan with all house plants, for anything we learn from actual experience is less likely to be forgotten than such things as we learn from books or conversation. Many Geranium-growers are afraid to use the knife on their plants. They don't cut back often enough; whereas, it is not good management to allow potted plants to flower too long; two months is long enough; then cut the tops back; if this is neglected they grow too leggy, with long, unsightly bare stems; and mind when you cut back, have the earth in the pot dry, and keep it dry until the wound heals over; because if they have too much water they will bleed to death.

Plants for winter blooming must be propagated in May and kept in pots all summer in some partially shaded situation, and keep pruning them back by pinching off the ends of the shoots. Then in September, if the plants have been carefully watered and had progressive shifts into larger pots, you will have a fine, stocky plant, full of leaves and in good shape for winter flowering; a plant that will be an orna-

Digitized by Google

ment on the flower stand or window shelf. And it is considered both genteel and fashionable to grow plants in our dwellings. There is no plant that rewards us better for the care and labor, and that gives us a larger variety of flowers and foliage, than the Geranium. But then this idea that the same plant ought to flower all summer and winter is a preposterous one.

There is no necessity of going to the florists every time you want a plant. Learn how to raise your own, then they will always be on hand. Many amateurs have far better specimens of plants than will be seen in most greenhouses. Plants for summer flowering may be propagated in winter, any time when slips are plenty. Pinch back when they are young, to make them stocky. Many florists don't like to pinch back young plants in the spring, because it nips out the first flower bud, and that bud might sell the plant, or he might want a cutting or two from them by and by. That is a wrong way to raise good, stocky, plants. Then, with him, it is a matter of expediency, for they sell best when in flower, no matter how leggy they are. For bedding out in summer, of course we would take all we can spare and plant them in some place where they will be partially shaded, because when they are planted in a very exposed situation our hot sun will spoil the flowers more or less by burning up the center of the flower before they grow to perfection. Should any of those that are planted out be needed in winter, dig them up before any frost injures them, and cut back both the roots and branches; pot them in medium sized pots, and keep them in the shade; and don't forget to give them no water until they start to grow; then water sparingly for some weeks, as too much water will bleed them to death again.

The varieties of the Pelargonium I shall say but little about, because there so many of them, all of them so distinct in leaf, flower, and fragrance, and all the different markings on their leaves; and everybody has their pet varieties; besides, new ones are puffed onto us every year, and not the least doubt many of them are an improvement on some of the old. House Geraniums in pots ought to have their foliage well washed twice a week to keep them healthy; and water them in the pot just often enough to keep them from wilting, and no oftener. A little liquid manure once a week helps an old plant. The compost for potting them with ought not to be too sandy or loamy. The best material to grow them in is: take the top earth from an old pasture lot, six inches deep, or from our oak ridges; always choose it where there

Digitized by Google

is a strong clay subsoil; take one load of this and one load of cow-stable manure; mix them together, and let them lay six months to mellow up; then it is ready for use. This mixture makes the best potting material we know of.

FLOWER BEDS—BEDDING PLANTS AND THEIR ARRANGEMENT.

BY WM. O. KULP, D. D. S., DAVENPORT, IOWA.

As much depends upon the size and form of the flower bed as upon its contents in producing that gratifying effect to the beholder which is so desirable, for if a flower bed fails to make a pleasing impression, it does not fill its mission. The designs should be in harmony with the surroundings, while the flowers in them may be in dazzling contrast. In fact, strong contrasts in beds of flowers are their greatest attraction, providing proper colors are selected and they are properly arranged.

Just what the form of the flower bed should be, depends upon the surroundings. Much artistic taste can be displayed in this. The key should be grace and harmony. Avoid all stiff set lines and right angles, for a flower bed ought to be as far removed from the graveyard appearance as possible. I would suggest such forms as the following: The full circle, half circle, full oval, half oval, heart-shaped, kidney-shaped, triangle, diamond, and the winding serpentine form, avoiding paralellograms and right angles. Flower beds should not be too large, better have several small ones, than one too large to reach the center of it with a hoe. The border of a bed has much to do with its graceful appearance. I then most earnestly urge the entire banishment of all brick, stone, boards, and turf, or sod borders, as belonging to the past ages. A tastefully designed iron border may be admissable under some circumstances. The general idea of flower bed borders ought to be changed. The design and size of the flower beds being decided upon, let the whole be marked out in miniature on paper, so as to

Digitized by Google

make no mistakes. Then let the ground be laid off and stakes be put close together until the design is represented, leaving three feet walks between the beds. Next proceed to cut out the sward with a sharp spade, leaving simply and only the edge of the cut sward as the border of the beds. If anything further is admissable, let bordering plants be used such as I shall enumerate further on. The next step is to prepare the beds. These must be well underdrained; therefore, if the soil is not sandy, it must be made porous by adding to it sand and gravel mixed with well rotted chip or barnyard manure. The soil should be turned up at least two feet when the bed is first made, and should be thoroughly enriched. After a bed is once properly made, it is a comparatively small undertaking to keep it in good condition for years. If it is not properly prepared, flowers will not come to perfection and half the pleasure is lost.

Walks between beds should be either gravel or sod. I would give the latter the preference, as the green color is in harmony with the plants and flowers, and with the lawn mowers are very easily kept in fine order. The edge of the border can be trimmed with a sharp sickle or knife. The centre of the bed should be raised from six to twenty inches, and gradually sloped to within an inch or two below this grassy walk, thus preventing the loose ground from being washed down among the grass. The foundation work finished, what shall we plant?

The world is full of beautiful flowers and gaudy leaved plants; it is impossible to plant all, so we must select from the list such as will be the most likely to give us and our friends the most pleasure.

Lovers of flowers differ in their tastes in this as well as other matters. Some love them simply for their beautiful colors, others for their botanical relationship, while others value them for their delightful fragrance. People generally are most in sympathy with color and fragrance worshipers; then the more we combine these two qualities in our beds the more pleasure they will contribute.

I will not say much of the annuals, as a good list was furnished in last year's report upon the subject, by Mr. Samuel Bowers, of Cedar Rapids. I may be permitted to make a few suggestions as to their artistic arrangement.

The Single Petunia is a very showy plant and blooms the whole season through. The bloom is too coarse for the front yard, still for its beauty of colors and fragrance it deserves a place, and I would

Digitized by Google

suggest an oval bed beside the carriage drive. It requires no company as it is enough in itself; and with this "distance lends enchantment."

Each variety of the annuals should be planted in separate beds, mixing colors, in order to produce the best effect. Except some of the low growing ones; these may be used as border plants in some cases, such as Candy Tufts, Sweet Alyssum, Mignonette, Lobelia, Gypsophila, etc. The Pansy must have a somewhat shaded situation and should be by itself. The Balsam is another showy kind and should occupy a background position, and should have the leaves pruned off in order to show the flowers. This can be safely done. The Phlox Drumondii is another showy flower, producing all colors, somewhat finer than those enumerated; it may therefore be brought more directly into the flower garden, but should also occupy a bed by itself. I might mention many others, but the catalogues are full of them and their descriptions.

Bedding plants proper are those that are produced from cuttings, thereby reproducing the exact plants in every respect, in limitless numbers. (They also include many of the bulbous family; a few of these I will mention in this paper.) Bed No. 1 I shall call Tropical bed. It may be the centre of a cluster of flower beds, or may be placed in the green sward by itself, or near the gateway, or as a background to the flower garden. It should be circular in form and not less than seven to fifteen feet in diameter. The following plants are suitable for such beds: For the center, Castor Bean *(Ricinus);* first circle around center plant, Cannas; second circle, Salvia Splendens; third circle, Gladiolus; fourth circle, Achyranthus Lindenii or Caladium Esculentum; fifth Coleus chameleon; edging or border, Alternanthera. The outer circles should be pruned so as to keep the bed shapely. This bed should be bountifully watered daily, and well cultivated and manured, in order that it may attain its greatest perfection.

The Verbena family is indispensible in a flower garden. It blooms continuously and is very showy, and by tastefully arranging colors grand artistic impressions may be made. As for instance, use the red, white and blue; red in the center of an oval bed, white next, and edge with blue. Keep all trimmed so that colors won't run into each other; thus a very attractive bed of flowers is made. Massing the high colors, such as Flame or Firebrand, in one bed, a grand effect is produced. Blossoms should be cut off before they go to seed, and thus a continuous succession of bloom is kept up.

Digitized by Google

When taller plants are desired the Salvias, Heliotropes, Geraniums, etc., should be used, but never mixed in one bed. Mass them in separate beds. A bed that attracted a great deal of attention in our grounds last season was diamond-shaped, about ten feet in length and seven in width, edged with Alternanthera, and the form of a cross made in the center of the bed with white Feverfew, and the spaces between the edging and cross filled with Scarlet Geraniums, all kept neatly trimmed. Ths taste of the gardener can be thoroughly exercised in thus pruning designs and artistically arranging colors.

The Coleus family is becoming very useful in ornamenting door-yards and flower gardens, as well as public grounds. Beds of all designs may be made with them, such as ribbon beds, carpet beds, etc. For such work those of high colors should be used. They can also be used as border and edging plants. The fancy leaved Begonia family can also be used to good effect; the Pansies and Fuschias also. In fact, almost any plants, when massed in separate beds, make a rich show.

But though the last in my list of bedding plants, certainly not the least desirable is the Tea Rose. If I could have but one flower bed it should be a bed of these, the queen of flowers. The idea of bedding or massing Tea Roses in flower beds is comparatively of recent origin. When once tried by any lover of flowers it will never be abandoned, for what flower can compare with the rose? These should be massed in the same manner as directed above for other plants. They should be set about two feet apart each way, beds well covered with well rotted manure to the depth of two or three inches, and often tilled. Set out only small plants; they will make a growth of from two to four feet in one season, and will blossom constantly. If used the seasons following they should be cut down nearly to the ground each year. When a more permanent form is desired "Hybrid Perpetuals" should be used. These need not be taken up each year. They do not bloom so freely as the Tea family, but the proper sorts will bloom more or less all summer.

Much more might be said upon this subject but time and space will not permit at this time. In closing, I would urge all to never let a season pass without a flower garden, well filled with bedding plants.

DISCUSSION ON REPORT.

Mr. Stewart: I bedded out my Geraniums in the hot sun, where there was no shade, and they did well and blossomed finely.

The Society adjourned till seven o'clock P. M.

Digitized by Google

EVENING SESSION.

The Society met as per adjournment, and was called to order by the President.

On motion of Abner Branson, West Branch, in Cedar county, was selected as the place for holding the next meeting.

The officers for the ensuing year were then voted for, with the following result:

President—GREENBURY WOOD, Springdale.
Vice President—C. N. STEWART, Washington.
Secretary—H. W. LATHROP, Iowa City.
Treasurer—HENRY STROHM, Iowa City.
Directors—DR. W. O. KULP, Davenport; ABNER BRANSON, West Branch; C. P. OSBORN, Fairfax; A. J. GRAVES, Ames; A. COOPER, Cole Creek.

LAST YEAR'S FRUIT CROP, ETC., IN LINN COUNTY.

BY C. P. OSBORN, FAIRFAX.

Mr. President—In reporting for Linn county, there is not much that is new in the way of horticulture. We had a good crop of strawberries; average price per quart 10 cents. The leading varieties in the market were Wilson, Charles Downing, Downer's and Green's Prolific, and in a few localities the Red Jacket. The last named (though a new variety) has given good satisfaction where known.

A fair crop of raspberries; Doolittle and Mammoth Cluster were the most abundant, prices being from eight to ten cents per quart.

A medium crop of cherries, of Early and Late Richmond; prices from eight to ten cents per quart.

A fair crop of grapes, principally Concord; prices from three to six cents per pound. A few other varieties have been grown in small

Digitized by Google

quantities. Mr. Bowers says some are very good in quality, but not to be relied upon for general cultivation.

Of apples we had a medium crop, prices ranging from 50 cents to $1.00 per bushel. Duchess, Astrachan, Cole's Quince, Utter, Plumb's Cider, Fameuse, Ben Davis, Jonathan, Janet, Willow Twig, were among the most salable of our Iowa apples in this county; there were but few Janets; the trees are suffering from overbearing last year. Linn county will soon furnish sufficient fruit for its own use.

Fruit culture is outgrowing its spasmodic excitements of a few years ago, over *exotic* varieties, and is settling down to more permanency on such varieties as have proved worthy of cultivation, so far as is known, and a less number of trees and plants, giving better care to them, and are getting more and better fruit in return.

There has been an advance in the ornamenting of our homes and surroundings, while there may not have been as much planting the past year as there was some years ago, yet it has been done with better success and with more taste, copying after nature, instead of the old automatic style of straight lines and square corners, and the keeping of them in due form. Thus the influence of your Society is working slowly in this county.

METEOROLOGY.

Prof. Witter: The relation of timber growth to rain-fall seems to be an intimate one, and the more we look into the matter, the more we see the effects that timber growth has upon rain-fall. The most treeless portions of the earth, are those deserts where there is the least annual rain-fall.

Secretary Lathrop: We need not go out of our own State for a demonstration of this principle. Commencing in the southeast part, where there is the greatest per cent of timber growth, we find we get the greatest annual average rain-fall; thence as we go across the State in a northwesterly direction, the further we go the less the per cent of timber, and the less also of annual rain-fall, and there is no theory but decrease of timber on which to predicate the diminution of atmos-

Digitized by Google

pheric moisture. The difference of soil, and the difference of altitude, will not account for it.

President Foster: Many are now comprehending the forces of nature in the atmosphere, and as they do this, they discard their old moonshine notions. If heavy timber growth produces heavy rain-fall, why do not those portions of the country that are heavily timbered, have deluges of rain?

Prof. Budd: Thirty years ago in the Adirondack mountains, there was a heavy growth of timber, but the lumbermen have gone in there and denuded it of timber; it has been burned over; the rocks have become exposed to the sun and the rivulets are dried up, and the fertility of the soil has been reduced for the want of moisture. The climate is so changed here, that we cannot raise what, even on our virgin prairie soil, we once could. In the Province of Bokara, in Central Asia, there used to be an annual average rain-fall of thirty inches, when now it is only fourteen, and this diminution is the result of reducing the area of timber growth, and the clearing up of the country.

Secretary Lathrop: The question as to *how* or in what manner the growing timber of a county affects the rain-fall is often asked, and not always answered. When in a hot summer day, I go to my iron pump, standing in a well fifty feet deep, and pump up the cool water, I soon find on the outside of that pump innumerable drops of moisture that have been collected there from the circumambient atmosphere by the cooling of the atmospheric vapor as it comes in contact with that pump. Now give me a forest of such pumps and let an atmosphere be blown over it in a hot summer day, heavily charged with vapor, and a precipitation of moisture would take place equal to a heavy rain. Now an atmosphere thus charged cannot be blown over and through a large extent of timber without being similarly affected, though not in so great a degree. The bodies of trees affect the free passage of the winds and shade afforded by the foliage, furnishes a cooler medium than the winds themselves, and thus moisture is deposited.

The following on Entomology was then presented.

Digitized by Google

INSECT STRUCTURE.

BY ALICE B. WALTON, MUSCATINE.

Wishing to select a subject for this paper not usually discussed in horticultural meetings, and yet one of vast importance to the horticulturist, we have chosen that of Insect Structure.*

The branch articulata of the animal kingdom is divided into three branches: Insects, Crustaceans, and Worms. Insects are divided into three orders: Hexapoda, those having six legs and three distinct sections to their bodies; Arachnida, or spiders, scorpions, etc., having eight legs; and Myriapoda, having a great number of legs.

Hexapoda, or six footed, as the word literally means, comprises all insects known as "true insects," and is divided into seven sub-orders. 1st. *Hymenoptera*, or bees, wasps, ants, etc., and is the highest of the insect world; 2d. *Lepidoptera*, or scale-winged insects, as butterflies and moths; 3d. *Diptera*, or two-winged insects, the flies; 4th. *Coleoptera*, or beetles having the upper wings or primaries hard, and called the electra; 5th. *Hemiptera*, or the "bugs," such as squash bugs, chinch bugs, plant lice; 6th. *Orthoptera,* or straight-winged insects, as grasshoppers; 7th. *Neuroptera*, or lace-winged insects. In this sub-order we find the dragon flies commonly known by several names, among which are darning needles, snake feeders, and musquito hawks. The last is a very good name for them, for they are carnivorous, and do live partially if not wholly upon musquitoes and other small insects.

All these seven sub-orders pass through in the course of their life four stages. 1st, the *egg;* 2d, the *larva*, which is the worm, caterpillar, or maggot state; 3d, the *pupa*, or cocoon state; 4th, the *imago*, or perfect insect. The eggs are deposited either singly or in groups. The *larva* is composed of a number of rings or segments, of which the typical number is eleven. The usual appendages are the legs. There are three pairs of true legs, situated on the first three segments, and one pair of *anal*, or terminal legs. Sometimes, as in the caterpillar, there are also four pairs of false or prop legs placed between the true and terminal legs. During the third, or *pupa*, state the greater majority

*This paper was illustrated by large sized diagrams.

Digitized by Google

of insects are inactive, and it may be stated as a general rule that the pupæ of the four highest sub-orders (Hymenoptera, Lepidoptera, Diptera, and Coleoptera) are inactive while those of the three lower sub-orders (Hemiptera, Orthoptera, and Neuroptera) are active. In the imago, or perfect insect, we find the body divided into the head, thorax, and abdomen. In the head we find the eyes, mouth, and feelers, or *antennæ*. The mouth is surrounded by the mouth-parts, which generally consist of an upper lip, or *labrum;* a pair of jaws called *mandibles;* a pair of smaller jaws called *maxillæ*, to which are attached little jointed feelers called *maxilliary palpi* and the lower lip, or the *labium;* to this is also attached another pair of little feelers called the *labial palpi.* The *palpi* are very sensitive, and are used in selecting food. The *mandibles*, or jaws, do not move up and down as in animals, but sideways. The *maxillæ*, or little jaws are used in seizing the food and in keeping it in the mouth while being prepared for digestion. These four, the *labrum*, *mandibles*, *maxillæ*, and *labium* are characteristic representatives of the mouth parts, but in every single group of insects they receive different modifications, and even in different species of the same genus they are not always the same. In the butterflies and moths we find the two little jaws, or *maxillæ*, lengthened and joined into a double tube or "tongue," through which they suck their food, In the Five-spotted Sphinx *(Macrosilla quinque maculata*, Haworth) the tongue is about four inches long, and when not in use it is coiled up like a watch spring and protected by the *labial palpi*, which are greatly developed: The *mandibles*, or upper jaws, are obsolete.

There are two classes of eyes — the simple and compound eyes. The simple eye, or *ocellus,* is the simplest form, being "a very convex, smooth, single cornea, beneath which is placed a chrystaline lens." There are usually three of these little simple eyes, and they are placed on the very top of the head. The compound eye is composed of a great many simple eyes, the number of simple eyes varying from fifty in the ant to 3,650 in the eye of a butterfly. The simple eyes are used in viewing near objects, and the compound eyes for distant vision.

The antennæ are slender many-jointed appendages, inserted in the head between or in front of the eyes, and according to Pachard it is believed by some that the sense of hearing is lodged in the antennæ.

The thorax, or second division of the body, is composed of three segments. Prothorax, or first segment; mesothorax, or second segment; and metathorax, or third segment. To the first segment is attached

Digitized by Google

the first pair of legs; to the second segment are attached the second pair of legs and first pair of wings or *primaries;* to the third segment the third pair of legs and second pair of wings or *secondaries.* In each side of the segments are the *spiracles* or openings of the trachea. They are situated between the attachments of the wings and legs.

The abdomen, or third division of the body, is composed of rings or segments in the sides of which are spiracles. The typical number of segments is eleven, though in some of the higher classes there are not so many.

The legs are composed of seven joints, of which the most important are the coxa trochanter, femur, tibia and tarsus. The tarsus is subdivided into from one to five joints, and the terminal joint ending in a pair of claws.

The wings are composed of a frame-work of veins and veinlets, over which is a sort of crust, and this crust in the butterflies and moths is covered with scales. The veins are double tubes, the inner one being a trachea, surrounded by a larger tube filled with blood; so that aeration of the blood is carried on in the wings and they thus serve two purposes, that of flight and help supply the place of lungs.

The venation of the wings in many insects is somewhat simple, there being five main veins and a number of veinlets. The five main veins are the *costal*, nearest the *costa* or front edge; *subcostal*, next below the costal; *median*, or middle vein; *submedian*, next below the median; and the *internal*, nearest the inner edge. The determination of species is sometimes based upon the venation of the wings. The wings of a great many insects, as in the grasshopper, are divided by the veins into three well marked areas; the *costal* area, nearest the front edge, the *median* or middle area, and the *internal* area, nearest the inner edge.

The boundaries of the wings are divided into the *costal* or front edge, which extends from the body to the *apex*, where is situated the *outer angle.* The *outer edge* extends from the *apex* [or outer angle to the *inner angle;* the *inner edge* from the inner angle to the insertion of the wing at the body. The limits of the edges of the wings vary in almost every *genus*, and their comparative lengths afford good generic characteristics. These divisions and descriptions of the wings are used mostly in describing butterflies and moths.

The internal structure is not used in describing insects and is yet of great interest, because of its being so unlike in some, and analagous to

Digitized by Google

in other respects, the anatomy of higher animals. Insects have no brain or lungs, the brain being simply a collection of ganglia, and the lungs consisting of trachea or air tubes ramifying throughout every portion of the body, and are accompanied by the veins, so that the blood receives air in every part of the insect. The trachea open on the sides by pores, called *spiracles* or *stigmata*. The *spiracles* consist of a horny ring closed by a valve. Within this valve there is a chamber, between which and the trachea is another valve guarding the trachea. The trachea is composed of three coats; the inner mucous coat and outer serus coat, and between these a spiral fiber. In breathing the muscular power is furnished by the contraction and expansion of the abdominal segments. When they expand the air rushes into the trachea mostly through the three pairs of thoracic and first pair of abdominal spiracles, the remaining spiracles being but little used.

The heart or dorsal vessel consists of a tube placed along the middle of the back of the abdomen. At the joints of the segments are valves which allow the blood to flow toward the head. These valves divide the heart into chambers and the aorta, into which the blood flows before passing into the veins, is only the division which lies within the thorax. The blood, after leaving the aorta, passes throughout every portion of the insect, and is returned to the posterior part of the heart.

The digestive organs consist of an alimentary canal and its appendages. The alimentary canal is subdivided into the mouth, pharynx and esophagus, supplementary to which are the crop or sucking stomach, proventiculus or gizzard, the ventriculus or true stomach, and the intestines, which are divided into the *ileum*, *colon* and *rectum*.

The nervous system consists of a double cord lying on the ventral side of the body, and having a ganglion corresponding to each segment. The cord is composed of two columns of fiber, the under one being the *sensitive* column and containing the ganglia, the upper being the *motor* column. The cord in the head, as before stated, is composed of a number of ganglia, thus forming a sort of elementary brain. The microscope reveals the fact that this nervous cord is formed of white surrounded by gray matter, and from this cord extend lateral nerve-branches to every portion of the insect.

The study of entomology as a science is at present in its infancy. It is thought when its principles, the structure of insects and their habits, shall be more universally understood, there will not be so great an annual loss caused by insects to the products of our land, which is

Digitized by Google

stated by Thomas and other competent authorities to be about thirty per cent.

On motion, a vote of thanks was given Miss Walton for her able, instructive, and entertaining essay.

VARIATION OF PLANTS.

BY PROF. F. M. WITTER, OF MUSCATINE.

Gentlemen, Members of the Eastern Iowa Horticultural Society—It is with a strong feeling of diffidence that I venture to express in anything like a formal manner my views on any subject connected with your field of observation and experiment. Horticulture and Floriculture are twin sisters, and I may ask your indulgence if these should be more or less united in what I may have to say.

There is probably no better known fact than the *variation* of plants. This variation extends apparently to all of the organs of the plant, and in many species it is capable of transmission through the usual methods of reproduction, viz: seeds, cuttings, layers, bulbs, grafts, etc.

The floriculturist watches for new varieties of flowers, and uses special means to produce them and render them permanent. He cares little or nothing for the fruit, exeept so far as it is serviceable to him in producing new plants of the same variety. The fruit might vary in a remarkable degree and it would scarcely attract his notice, but let any new feature appear in the flower, it at once receives the most careful attention.

The Horticulturist neglects the variations in the flower and seizes upon the new forms that occasionally arise in the fruit and makes special effort to cause new varieties to appear. It is not at all likely that valuable variations in flower and fruit in any plant; where both are sought, will occur. The causes and amount of variation are questions of the greatest interest to every one interested in growing flowers or fruit.

As long as plants are in a wild state and no alterations in soil and

Digitized by Google

climate occur, they are generally quite constant in leaf, flower and fruit. I may mention, however, a few instances of the variations of flowers in a wild state that have come under my own observation.

Verbena stricta has *blue* flowers, as all the botanists say, and as I have observed, but last summer (1879) in company with Mr. Fred. Reppert, of this city, I saw *pink* and *white* flowers of this species growing along the levee thrown up to protect Muscatine Island from the Mississippi, about three miles southwest of this city. All the flowers on the stalk were the same, and there was but one plant of each variety. The blue flower was very abundant in the same locality. Seeds were obtained of the white variety and it remains to be seen if they will produce plants with white flowers.

Anemone Caroliniana, which prefers light sandy soil, is nearly white or blue. The white and the blue flowers are about equally divided, and grow in the same field.

Hepatiaca triloba is the earliest flower in this locality. It varies in form of leaf, color of flower, and becomes occasionally double.

Thalictrum anemonoides is variable in color and number of sepals

Viola sagittata varies greatly in the form of leaf, and somewhat in the color of flower.

It seems, so far, impossible to determine whether we have *cypripedium pubescens* and *parviflorum* or not. We certainly have one, and it may be both.

Phlox divaricata varies from *blue* to nearly pure *white*.

Ranunculus repens in certain localities sends up broad, flat stems, and the flowers on each stem are quite different in shape and arrangement from the flowers on round stems.

About thirty years ago, in Delaware county, in this State, there were growing wild plums that were red, spotted with yellow, and yellow when ripe. The yellow variety was esteemed above the others, showing that the variation had affected more than the color. We should expect plants to have become settled, in a wild-state, in the various regions of the earth and continue to reproduce strictly after their kind, ages before man in any way affected them. This, in the main, is certainly true, but it appears that changes are constantly going on, such as the interchange of lake, swamp, and dry land; timber and prairie; sand, marl, and clay, intermingling or separating; a series of unusually wet seasons, or long continued drought; the same for heat and cold, and the presence or absence of animals of certain kinds, have had, without doubt, much to do with the forms of plant life.

Digitized by Google

Certain groups of plants are incapable of self-fertilization. Notably among these are the *orchids*. They produce perfect flowers, but many of the species depend entirely upon certain insects to carry the pollen of one plant to the stigma of another.

Indeed, cross fertilization seems to be a necessity as well in the perfect as in the imperfect flower. What has already been said relates to plants in a wild state. If now we turn to plants under domestication, the systematic botanist is in many cases unable to place the plant in his system. In many instances the domesticated plant is not found in a wild state, and we are reduced to the necessity of supposing all the wild plants of certain species to have become extinct, or that the plant is a hybrid of two wild species from which the domestic plant differs so greatly as to bear at most a very remote resemblance to its ancestors, or that without crossing, the domestic plant has varied through such means as man may control, and its valuable variations selected and reproduced by seeds or otherwise, till its ancestor is no longer to be recognized. The *peach* is said to vary to *nectarines*, and there is no wild peach except such as have evidently escaped from cultivation. Mr. Charles Darwin, in his work entitled, "Animals and Plants under Domestication," gives a lengthy account of the peach, and concludes that it must be derived from the *almond*. The strawberry is wild in Europe and North America.

Botanists enumerate and describe five or six species, two or three of which are now found wild in the United States. *Fragaria Virgininana* is probably the only native of this country. Several of these species have been crossed and re-crossed, and the hybrids produce perfectly from the seed. One of the varieties of *Fragaria vesca* does not send out runners and this character is reproduced by seed. The most singular fact concerning strawberries is the tendency, under certain conditions, for the sexes to separate. It is well known that some of our best varieties will produce nothing unless a stock which bears a perfect flower is planted near. One variety is known with *one* leaf, and others with *five* instead of the normal number, *three*.

Wheat, *Triticum vulgare*, is extremely variable in all parts of the spike or head, and also in the time of planting.

Corn, *Zea mays*, varies in height from sixteen inches to eighteen feet, and the grains vary through nearly every shade color. It varies also in the number of rows of grains on the axis or cob, from six to twenty-four, and the number of grains in a row, in the period of ma-

Digitized by Google

turity from three to seven months, in smoothness or roughness of the grain, and even in the composition of the grain itself. Instances of ordinary and extraordinary variations of leaves, flowers and fruit, some of which in each, have been selected, perpetuated and improved, could be extended almost indefinitely.

A perusal by any one interested in plants of Mr. Darwin's most excellent works relating to variation, fertilization, cross-fertilization, climbing and insect-eating plants, cannot fail to elicit thought, observation, and experiment.

If, then, plants vary in a wild state or in a state of nature, where we should expect them to be essentially constant, to such an extent as to cause botanists of the present day to rank them as both species and varieties, such as some of the forms of the oak, *Quercus*, and violet, *Viola*, should we be surprised to find cultivated plants in some cases, inextricably confused when we attempt to reduce them to fixed and absolutely unchangeable species. It has often been said, and I believe with much truth, that if we found in a wild state many of our cultivated plants, botanists would at once raise them to the distinction of species, where varieties are scarcely recognized by them now, as is notably the case with Indian corn, *Zea mays*.

It would seem, therefore, that the question, whether a certain form of plant growth is to be ranked as a *species* or a *variety*, depends not so much upon the difference in form as upon the knowledge we have of the history of the plant and the permanence of its chief characters.

A strawberry in a wild state with one leaf and not variable to any considerable degree would be regarded a good species, but because we know it to be a cross or hybrid, it is at once dropped to the position of a variety. As botanists weigh the characters and history of a plant, these doubtful cases arise which in our present state of knowledge cannot be settled, in fact may never be settled.

If we cease to look upon species as being capable of exact and final definition, not liable to vary to any considerabe degree, or that genuine species cannot be crossed, or if crossed the offspring will necessarily be sterile, we shall without doubt have taken a great step in advance. When I find a plant either wild or domesticated that differs in a few particulars from its nearest relatives, as in form of leaf, flower or fruit, size, time of opening its leaves or flowers or other characters, and these are reasonably constant under given conditions, why should I consider it a matter of any real moment whether it be ranked as a species or a variety?

Digitized by Google

It can in no way change our arrangement as to the classification of plants, for we put them in a serial order according to the number of characters that are common to all, placing those with the least difference nearest to each other, whether we hold them to be derived from a common ancestor or not. It will make, however, a vast difference in our methods of study. The theory of descent leads us to assume at once that organisms bearing close resemblance to each other are more or less closely related *in fact* and not merely *in appearance*. The blood relationship, as it were, is sought. On this view we can predict that any unusual gap in forms around us we may expect to see filled by plants from other parts of the earth, or if not not now existing the intermediate forms should be found fossil, if the records of the past history of the earth were fully preserved.

We should expect exotic plants to alter more or less in adapting themselves to their new surroundings, and these alterations should, after several generations become fixed so that reversions to the parent forms would be of rare occurrence. From this standpoint we at once seek for causes competent to produce the effects to be seen around us, believing that agencies capable of changing plants bearing perfect flowers to those bearing imperfect; from normally blue flowers to white; from plants that can survive our winters to those where not one in 10,000 can survive; from plants not more than sixteen inches high and ripening fruit in six weeks from time of planting, to plants eighteen feet high and requiring three months or more to mature; from drooping or pendulous branches to upright or fastigiate, and so *ad libitum* can, under the theory of variation, natural or artificial selection and inheritance, produce the wonderful, infinitely diversified, mysterious and grand plant-world about us.

On motion, the thanks of the Society were voted to Prof. Witter for his interesting essay.

Prof. Budd: Fruit men pay too little attention to the character of the flowers on their fruit trees. While some varieties, like the Yellow Bellflower, that bloom profusely, are weak and deficient in flower, and consequently unproductive in fruit, others, like Oldenburg and Gros Pomier, are notably perfect and vigorous in flower, and can resist the adverse influences of heat and cold, and drought and moisture, and produce heavy crops of fruit. With these fruits is the rule, with the the others it is the exception.

The following essay was then read.

Digitized by Google

INSECTS INJURIOUS TO THE STRAWBERRY.

BY HERBERT OSBORN, OF THE AGRICULTURAL COLLEGE.

To the Eastern Iowa Horticultural Society—In compliance with a request from your Secretary, I send an article in the department of entomology. Having but a few days' notice, and that when other duties require much of my time, I have necessarily confined myself to matter already in large part worked up, but nevertheless of sufficient importance I think to be worthy of your attention.

In a field so vast, a general discussion is of little avail considered as a practical assistance in working against our enemies, and for this reason I have chosen to consider here the most prominent insects opposed to a single limited branch of the horticulturist's labors, namely, the cultivation of the strawberry.

These insects, when in the destructive stage, may be readily distinguished by the following table of characteristic habits.

A. *Feeding on the roots.*

(*a*) Large white grub, an inch or more in length.
White grub-worm.....*Lachnosterna fusca.*

(*b*) Small dingy-white grub, less than half an inch in length.
Grape Colaspis (larva).....*Colaspis flavida.*

B. *Boring in the crown.*

Strawberry Crown-borer.....*Analcis fragari æ*

C. *Feeding on the leaves.*

(*a*) Externally puncturing them with minute holes.
Strawberry False-worm.....*Emphytus maculata.*

(*b*) Folding leaves together, feeding within.
Strawberry Leaf-roller.....*Anchylopera fragariæ.*

The White grub-worm (larva of May-beetle). Judging from the statements made in the annual reports of horticultural societies, and from other sources, this is one of the most frequent and destructive depredators in the strawberry plantation. It is, however, by no means confined to the strawberry, but is equally destructive in meadows and lawns, and works to some extent even among vegetables under constant cultivation. Its great abundance is yearly attested by the swarms

Digitized by Google

of beetles known as May-beetles, June-bugs, Dor-bugs, etc. But these are only a partial representation, for as the grub requires three years to mature, a portion only of the existing grubs can issue each year as beetles.

We see frequent statements lauding the value of salt as an exterminator of these grubs; and though many times it seems to have been all that was claimed, I wish to enter a mild protest against too great confidence in it as a certain remedy. I will not assert that salt can have positively no effect upon them, but I would insist that when statements are made declaring it a sure destroyer, that proof be given that it is to this cause and no other that the disappearance of the grubs is due. When it is remembered that the salt is usually applied when the grubs are nearly ready to transform, the time when they are most destructive and hence most noticeable, and that they are then sure to soon disappear in this form without any assistance, it will be seen that it is by no means safe to jump at once to the conclusion that they have been killed by the salt.

The beetles are destructive to various shade trees, and when collected on these may be shaken down in great numbers, gathered, scalded and fed to hogs.

The Grape Colaspis grub, which lives on the roots of the strawberry, is, as beetle, very injurious to grape vines, and it is usually treated as a grape-vine pest; but Prof. Riley states that it is difficult to say whether the crown-borer or this root-eater is the most injurious to the strawberry. It may, therefore, very properly claim a brief mention here. The beetles, which also sometimes do much damage to the foliage of the strawberry as well as the grape, appear and deposit their eggs during the summer months. The larvæ soon hatch, and may be found upon the fibrous roots all through the fall, winter and spring months.

If there be any virtue in salt, I should think it far more applicable to these than the preceding. Prof. Riley states that ants destroy the pupæ, and that for the perfect beetles the same remedies will apply to this as to the Colorado Potato-beetle.

The Strawberry Crown-borer is somewhat similar to the preceding in appearance, but works inside the crown of the plant, the larva commencing at the top and working downward into the pith. The beetle, which is about one-sixth of an inch long, and chestnut-brown in color, appears above ground during August. It seems that they might be

Digitized by Google

destroyed by plowing under the strawberries immediately after fruiting, when the grubs will perish with the plants.

The Strawberry False-worm is the larva of one of the Saw-fly family *(Tenthredinidæ)*. It is greasy, dirty-green in appearance, and is distinguished from the following and other somewhat similar larvæ by having twenty-two feet. It eats numerous holes in the leaves, appearing first about the middle of May. A second brood of worms appears in July. The adult insect, which is a little smaller than a honey-bee, is pitchy black in color, with two rows of tranverse dull whitish spots on the abdomen. As these adults are seldom noticed, but little can be done to attack them in any way. The worm has the habit of falling to the ground when disturbed, and advantage may be taken of this fact to destroy it in various ways. Also applications to the leaves will be effectual, but poisonous substances will necessarily be avoided during the time just previous to the ripening of the fruit, unless the worms are so bad as to render the sacrifice of the crop desirable.

The Strawberry Leaf-roller is at once distinguished from the preceding by its habit of curling and tying the leaves. It may further be distinguished by having only sixteen feet, and it belongs to an entirely different order of insects, producing a moth instead of a bee-like adult. It is, if anything, more to be dreaded than the preceding, as it is more constant in its attacks and more difficult to contend. The moth issues in spring from the pupa, which has passed the winter, and lays her eggs, from which the larvæ appear in June. These mature, change to pupæ within the leaves, and issue as the second brood of moths in early July; from these the second brood of larvæ appear and complete their growth in the latter part of September, then changing to pupæ and remaining in this form till spring.

Specimens which I collected the past summer, supposing, of course, they belonged to this species, were found to differ so considerably that I took pains to rear the perfect form. The larva is very similar to Prof. Riley's description of this species, only it is more than twice as large, being nearly an inch in length, while this in the description is given as .35 of an inch. The moth differs very considerably in the markings, besides having an alar expanse fully twice as great.

As yet no description has been found to cover it, but I defer giving a description or name till further works can be consulted. It is likely to prove as injurious as the known species, and will have to be met with the same remedies. There seems little chance to fight them

Digitized by Google

other than leaving them to their natural enemies, except by plowing under strawberries and all where they are numerous. Hand picking the curled leaves before the moths escape will accomplish considerable where they are not too numerous.

In order to more thoroughly work up the insects at work in the different departments of horticulture, I shall be glad to receive specimens of any such that you may find. Send in air-tight packages, if possible, never punching holes to admit air, as it is useless, and may sometimes allow the escape of parasites. Larvæ, if dead, may be packed in cotton soaked with alcohol, to keep from shrinking.

Agricultural College, December 1, 1879.

On motion, the Society adjourned to meet to-morrow at nine o'clock.

Digitized by Google

THIRD DAY.

THURSDAY, DECEMBER 11, 1879.

Society met as per adjournment, and was called to order by the President.

Winter-killing of trees was the subject on the programme for consideration.

Secretary Lathrop: In the year 1858 I planted my first orchard, and of course had to get trees that had been in the nursery the two previous hard winters, but about a dozen of the trees died within a year or two, though all lived the first season, which was a wet one. When I reset the twelve lost trees, I put them out in the fall, and having ample time, they were well planted, but three of them survived, and I found the injury was sun-scald, sap-scald, or something of that kind, on the southwest side of the tree, about where the two o'clock sun would strike them the strongest. Though these nine were dead in body and branches, the roots were all alive. Though I kept no record of the weather that winter, I am of the opinion that it was warm sun, followed by severe freezing, did the damage. Wherever I find the bodies or large limbs of my trees diseased, I find generally that disease the worst on the places where they are most exposed to the hot suns in winters.

Mr. Schooley: Mulching has a tendency to keep trees from winter-killing, though mulch often affords a harbor for mice,

——— ———: How can peach trees be kept from winter-killing?

Secretary Lathrop: Some years ago Mr. Smalley raised peaches on the steep bluffs, at Muscatine, by bending the trees down and covering them, and where the bluffs were quite steep, the trees required but little bending to reach the ground, as they were bent up hill.

Prof. Budd: Dr. Weed had some trees that were protected by a shelter of boards built around them.

Mr. Mead: Mr. George H. French, of Davenport, raised peaches by bending down the trees and covering them. Before bending, the roots on one side of the tree were cut off with a spade.

Prof. Budd: Some peaches were budded on Miner plums by a

Digitized by Google

horticulturist at Des Moines, and they proved a success. They were budded on sprouts near the ground, and could be easily protected. We should not lose sight of a principle in horticulture. The peach originated in China, and that country has a climate like ours from Florida to Minnesota.

Secretary Lathrop: Although the peach originated in China, it is not probable that it can be raised in all parts of that empire. In going from Florida to Minnesota, in our own country, we take Delaware and New Jersey on the way, and we find them in neither of the extremes of our climate, and yet they are the best peach growing portions of our country. We must have something more hardy than we have had yet, among peaches, before we can domicile them in Central or Northern Iowa.

Prof. Budd: By propagating the orange for a long series of years in northern Italy, it has become acclimated and hardy there. In northern China the autumns are dry like ours, and our importation of fruits should be from countries where the fruit trees make a determinate and perfect growth in autumn, that would fit them to go through our severe winters. Plants imported from the dry climate of China to England do not seem to flourish and bloom there as they do in their native land, but brought to our country, they seem to be at home in our climate, and make a perfect growth.

President Foster: We are not weather prophets, and cannot foretell what our winters or our summers will be. We must take our chances. We must be guided in our future operations by what we have experienced in the past. We have learned that winter drought is as bad as winter cold, or rather that the winter's cold is more destructive in a dry winter than a wet one. In humid climates trees will endure greater extremes of cold without injury than in dry ones. Take two trees standing side by side in winter, cut off one with a saw and insert a piece of tin in the place opened by the saw, but preserve the upper part of the tree cut off in its natural position, by supports, and it will very soon show that the tree cut off is drying up, while the other is not, thus showing that there is a circulation of sap or moisture in the winter between the branches and roots of the tree.

Prof. Budd: Much can be done by taking our new varieties and watching them in the fall as to the maturity of growth. If we find that a variety has its materials for future growth all stored up in perfection it will be a variety to be adopted. On the other hand, if we

Digitized by Google

find a variety that does not store up in its cambium layer the material in perfection, discard it.

The following paper by Samuel Edwards, of "The Evergreens" fruit farm, Mendota, Illinois, was read.

EVERGREENS.

To Hon. Suel Foster and members of the Eastern Iowa Horticultural Society: Gentlemen—By request I send this brief paper on Trees for the Farm and Home, with regrets of my inability to attend your meeting in person, to enjoy the kindly greeting of friends and gather from your councils much valuable information.

Most people admit that in no other way can so valuable an improvement be made on a prairie farm as by a judicious planting and transplanting of trees, yet how slow the masses are to enter into the work, with the zest its importance demands. Fruit trees are planted on the opening of most farms, and screens should be planted at the same time, that they may attain sufficient size to prevent the blowing off of fruit by high winds when the trees have reached a bearing size. For this purpose, and for screens to farm buildings, stock-yards, and along the west and north sides of farms, evergreens are best. Scotch, White, and Austrian pines, and Norway spruce, give good satisfaction A single row set closely, say six feet apart, and well mulched, will soon make as good a protection as a stone wall. In addition to the varieties named, for ornament in yard, lawn, or park, Norway or Red pine, Swiss Stone pine, Maratime pine, Balsam Fir, Siberian Arbor Vitæ, Douglas spruce, and Menzie's spruce from Rocky mountain seed, Picea Pichta and Picea Nordmanniana, and in most soils Black spruce, are all fine. Of dwarfish evergreens Irish juniper needs protection in winter, Swedish juniper hardy but not beautiful, Tamarix leaved juniper, American yew, hardy, endures shade well. Pinus Mughus hardy, Rhododendron Cotawbiense needs covering with evergreen boughs, or similar protection for winter.

Of deciduous trees no variety is better for the street than genuine White elm. A very inferior variety of elm has been planted for it, which should be dug up. Sugar maple for this purpose is equal to

Digitized by Google

any tree, but it requires a long time in which to mature — from thirty to fifty years. Norway maple is equal to this, and retains its foliage later. White and Green ash are also fine varieties for street planting, and also for timber. As ornamental trees, European larch and Catalpa speciosa (both valuable for timber), Cut-leaved, Weeping, and Blood-leaved birch. Wisconsin Weeping willow requires pruning to get it up. Horse chestnut, Japan ginkgo, Magnolia acuminata, and tripetala, are desirable, and so far hardy here. Tulip trees planted in 1846 grew well for twenty-five years, when all in this section of country were winter-killed.

Many varieties of Weeping ash, linden and thorn, have been tried from eastern nurseries, but they have all proven tender.

Mountain ash are sure to be destroyed by borers. American and Spanish chestnut, and English walnut, are tender on soil underlaid at the depth of four feet with tenacious clay.

Prof. Budd: Abies Picta is more known as Abies Sibirica, and it is hardy. Abies Engelmanii is grown at the foot-hills of the Rocky mountains, and it grows well here. Can be found in Floyd county, and it is growing at Des Moines and other places in the State. It is sometimes called a fir, and its branches are pendant and act like a shingled roof in shedding water. It is very beautiful, and can be got from some of our nurseymen.

Retinospora obtusa.—This tree is from northwestern China, and it will endure our hot suns while very young.

Maritime pine came from the Rocky mountains, and it is a trailing tree in growth; will spread ten or twelve feet when not more than four feet in height. It is quite hardy in our climate.

The Savin is a perfectly hardy evergreen, and it can be trained to almost any shape.

President Foster: I would name the evergreens in the order of their value, as follows: Norway spruce, Austrian pine, White pine, and Scotch pine.

Secretary Lathrop: About eighteen years ago, a hundred young elm and maple trees from the timber were planted in the Campus of the State University at Iowa City, and to-day the best trees on the University grounds are those young maples. For the first few years after being put out they grew slowly, but now their growth is rapid, and they are very symmetrical in form.

Mr. Branson: I have raised the Sugar maple from seed, and they make a very good growth while young.

Digitized by Google

Prof. Budd: Some prairie settlers raise the Box elder in groves from the seed, and when large enough, transplant them to be used as plants on which to fasten wire in making fence. When planted thickly in groves or nursery they grow up tall and straight.

Mr. Mead: Would not the catalpa or ailanthus do for this purpose?

Prof. Budd: The ailanthus is not a hardy tree and it would be apt to winter-kill. Has any one had experience with putting out large evergreens, and cutting back the limbs severely at time of planting?

Secretary Lathrop: Some two years ago I put out fourteen large evergreens, mostly Scotch pine. They were from eight to twelve feet in height, and all the terminal limbs except the top one were cut back, and all but one of the fourteen lived, and during the summer clusters of buds for the next year's growth were formed where the limbs had been cut back.

Mr. Schooley: I put out some White pines from which the limbs were nearly all cut off and they grew and formed branches.

President Foster: I would shorten in and cut back large evergreens at time of planting.

FINAL RESOLUTIONS.

Resolved, That we tender the thanks of this Society to the Muscatine Scientific Academy for the use of their excellent hall in which to hold our meetings, and to the press of the city for their faithful report of the deliberations of our Society.

Digitized by Google

TREASURER'S REPORT.

EASTERN IOWA HORTICULTURAL SOCIETY, *in account with* H. STROHM, *Treasurer:*

1879.		CR.
Dec. 2.	By balance on hand from last year	$10.85
	Membership fees received at Muscatine	17.00
	Total	$27.85

1879.		DR.	
Dec. 2.	To amount paid for fuel and gas	$ 1.25	
	To amount paid for janitor	1.50	
	To postage and expressage on Reports, paid by Sec'y	3.40	
	To postage on manuscript, by secretary	1.15	
	To postage on letters	.45	
	To notices on postal cards	2.25	
	Salary of secretary	17.85	
	Total	$27.85	$27.85

The Society then adjourned *sine die*.

H. W. LATHROP, *Secretary.*

Digitized by Google

ESSAYISTS.

The following is a list of the essayists for the next year, with their subjects:

CHERRY AND PLUM.

J. H. Pearson.....Ainsworth.
A. Cooper.....Cole Creek.

THE PEAR.

E. Mead.....Davenport.
E. M. Guffin.....Iowa City.

NURSERY MANAGEMENT.

A. Branson.....West Branch.

SMALL FRUITS.

T. Walker.....West Branch.
J. K. Bloom.....Lisbon.

GRAPES.

H. Strohm.....Iowa City.

HORTICULTURE.

Dr. W. O. Kulp.....Davenport.
Samuel Bowers.....Cedar Rapids.

BOTANY IY ITS RELATION TO HORTICULTURE.

J. D. Putnam.....Davenport.
Prof. F. M. Witter.....Muscatine.

ENTOMOLOGY.

Miss Alice Walton.....Muscatine.
Herbert Osborn.....Ames.

EXPERIMENTAL HORTICULTURE AND NEW FRUITS.

Prof. J. L. Budd.....Ames.

EVERGREENS AND HOME ADORNMENT.

A. J. Graves.....Ames.
Moore Briggs.....Wyoming.

THE GREEN-HOUSE AND ITS PLANTS.

C Stewart.....Washington.

HOUSE PLANTS AND THEIR CARE.

Mrs. Sweet.....Tipton.

THE ORCHARD.

H. W. Lathrop.....Iowa City.
Isaac Schooley.....Centerdale.

Digitized by Google

OFFICERS AND MEMBERS.

The following are the officers and members for the year 1880:

OFFICERS.

President—Greenbury Wood ..... West Branch.
Vice President—C. N. Stewart ..... Washington.
Secretary—H. W. Lathrop ..... Iowa City.
Treasurer—H. Strohm ..... Iowa City.

DIRECTORS.

Dr. W. O. Kulp ..... Davenport.
Abner Branson ..... West Branch.
C. P. Osborn ..... Fairfax.
A. J. Graves ..... Ames.
A. J. Cooper ..... Cole Creek.

MEMBERS FOR 1880.

Samuel Bowers ..... Cedar Rapids.
J. L. Budd ..... Ames.
E. Mead ..... Davenport.
Isaac Schooley ..... Centerdale.
L. O. Mozier ..... West Liberty.
Suel Foster ..... Muscatine.
H. Strohm ..... Iowa City.
H. W. Lathrop ..... Iowa City.
E. F. Jodick ..... Muscatine.
N. K. Fluke ..... Davenport.
C. N. Stewart ..... Washington.
W. O. Kulp ..... Davenport.
A. Branson ..... West Branch.
F. Reppert ..... Muscatine.
F. M. Witter ..... Muscatine.
Jos. E. Hooper ..... Muscatine.
J. P. Walton ..... Muscatine.

Digitized by Google

Western Iowa Horticultural Society.

ANNUAL MEETING OF THE WESTERN IOWA HORTICULTURAL SOCIETY.

The Western Iowa Horticultural Society met in annual session at McMacken's Hall, at Council Bluffs, December 10th, at 10 o'clock, President A. F. Collman, in the chair. The meeting was opened with prayer by L. A. Williams. The members of the Society were then welcomed to our city by Mayor Cochran in a brief address, after which President Collman delivered his annual address, which is given in full.

PRESIDENT'S ADDRESS.

Fellow Members of the Western Iowa Horticultural Society—To-day we meet to celebrate our fourth anniversary. Again another year's history is written on the scroll of time, and we meet to-day to listen to its teaching. History in our calling is constantly repeating itself, and what has happened in years gone by we may reasonably expect will happen again. The same dry falls and long cold winters that we have had, we may have again; the fierce storms that have swept over our country may visit us again; the young orchard that looked so promising in some localities one year ago to-day, and its owner looking forward to the day when his new variety would bear him luscious fruit, to-day presents a different aspect; then full of life and vigor to all appearance, now looks sickly and blighted.

Digitized by Google

Our life is full of failures, from the cradle to the grave. We meet disappointments all along life's troubled sea. But our failures are forgotten, if we only seek a remedy. Those of us who are never disappointed never get much wisdom. So by meeting our fellow men in similar callings with our own, and comparing our failures and successes we get wisdom.

Though somewhat depressed by the results of the last fruit season, we cannot fail to have our hearts lightened and our hands strengthened by our discussions, and by the very presence in our midst of a Society whose members show by their intelligence, enthusiasm, and refinement, that horticulture draws to its service many of the best and ablest men of our country.

Surrounded as horticulture is by many unsolved problems, may we not hope that the action of this Society will, to some extent, clear away the fog and rubbish that impede us and leave us a purer atmosphere and a clearer field, in which to pursue our calling, than we have heretofore enjoyed. We are glad to believe that these hopes will be realized.

Let us toil on in our noble calling. Let us recommend the Jonathan, Ben Davis, Janet, Minkler, Dominie and Roman Stem for winter, and Duchess of Oldenburg, Fameuse, Lowell, Dyer, Wealthy and Gros Pomier, for summer and autumn, to every planter. For a man's true wealth hereafter is the good he does in this world to his fellow man.

Stand by the Concord, the Turner, the Mammoth Cluster and the Snyder. Be slow to recommend all new untested varieties that some recommend who care more for your dollar than your value received; men that have specialities such as an apple that will keep all winter on the tree, or an evergreen peach tree that never fails to bear, or the bush strawberry, grape vine, raspberry, seedless grapes, and several other things that they sell at exorbitant prices. It is useless to tell intelligent men that the last named varieties are a fraud and yet some even in our enlightened Iowa allow themselves to be swindled.

Let us turn our attention more to timber than heretofore. We all have little corners on our farms that yield nothing but weeds, that are an eye-sore to us every time we pass them. If we could plant them with ash, larch, or Scotch pine, they would not only be an ornament to the farm, but be a shelter for the winged songster, and raise our thoughts to Him who made them; furnish us with refreshing shade from the scorching sun in summer and break the bleak winds in winter, and finally stand as a monument to your memory when you are gone.

Digitized by Google

I thank you for the many courtesies you have shown me during the three years I have been your presiding officer. Again, I thank you.

The Secretary read a report from Adams county, by Jesse Homan. The report covered considerable ground and elicited considerable discussion. Mr. Bacon asked as to the Maiden Blush apple, it was thought by some that it became more hardy with age. Mr. Raymond said that the oyster shell bark-louse could be killed with carbolic soapsuds. Messrs. Collman and McWilliams said lye syringed over trees about the first of June was good. Mr. Williams recommended soaping trees both for prevention and remedy of bark-louse and general benefit to trees. Mr. Bacon recommended planting apple trees of better quality than many are planting, and asked particularly about Maiden Blush. A. S. Bonham recommended this variety and thought it worthy of a place in every orchard. Mr. Ferry thought it too tender for general planting. Mr. McWilliams has planted in Crawford county successfully for several years, but all have failed. Mr. Bacon recommended planting hardy varieties and top-grafting with Maiden Blush.

The discussion brought out the fact that some varieties that are considered reliable in the southern part of the State were not reliable further north. Mr. Williams thought that on clay subsoils the Maiden Blush would do well on its own roots, but on porous subsoils should be top-worked.

The Minkler was discussed and considered hardy.

L. A. Williams, director for Mills county, made a verbal report. Fruit generally a failure, except grapes. Mr. Williams marketed 11,000 pounds of Concord grapes at four and a-half to five cents per pound.

Hugh McWilliams, director for Crawford county, made a verbal report. He said it was eighteen years since he settled in Crawford county. He planted a quantity of apple seeds with the intention of starting a nursery, but failed to get the seedlings grafted. He sold the trees and many of them are now bearing, some of them of good quality and fine appearance. Of late years many trees of grafted fruit have been planted. He spoke of the careless manner of handling trees by agents, many of them delivering trees in a damaged condition.

Several spoke of the careless manner that some buyers handle trees.

On motion, the meeting adjourned for one hour.

Digitized by Google

AFTERNOON SESSION.

Met pursuant to adjournment.

H. C. Raymond read a report as director of Pottawattamie county. Thought that fruit buds were injured on fruit trees by small insects about time of blooming. Others attributed the failure to frost.

J. M. Russell, director of Page county, made a verbal report.

The President then declared the election of officers to be in order, and appointed Thomas Bonham and J. K. Rice as tellers, first ballot to be informal.

On formal ballot H. C. Raymond having received a majority of all the ballots cast, was declared duly elected President. Mr. Collman, the retired President, introduced the President elect, who assumed the duties of the office, making some appropriate remarks, thanking the Society for the honor conferred, and making some suggestions for the future.

The following named gentlemen were elected:

President	H. C. RAYMOND	Council Bluffs.
Vice President	DAVID BACON	Magnolia.
Treasurer	L. A. WILLIAMS	Glenwood.
Secretary	GEO. VAN HOUTEN	Lenox.

On motion, the Secretary was instructed to cast the ballot of the Society for directors, the nominations having been previously made by the Society, and it was as follows:

DIRECTORS.

Mills county	CHAS. MUNSINGER	Tabor.
Adair	C. W. ANDREWS	Orient.
Adams	J. S. MCCAULEY	Corning.
Cass	SILAS WILSON	Atlantic.
Crawford	HUGH MCWILLIAMS	Denison.
Harrison	J. D. ROGERS	Logan.
Montgomery	E. KRETCHMER	Coburg.
Pottawattamie	H. A. TERRY	Crescent City.
Fremont	HENRY SHAFER	Sidney.
Monona	J. A. MCWILLIAMS	Onawa.
Page	J. M. RUSSELL	Essex.

Digitized by Google

Shelby	J. P. BLACK	Harlan.
Taylor	R. G. MOON	Bedford.
Union	WM. TAYLOR	Creston.
Woodbury	GEO. H. WRIGHT	Sioux City.
Ida	S. V. CARR	Ida Grove.

The Secretary presented his annual report, in which he stated that the present year, owing to various causes, has been one of almost entire failure so far as tree fruits were concerned, supposed principally to have been caused by early expansion of buds and the late frosts which followed. He also says:

The affairs of the Society have been conducted as economically as possible, with a view of getting and keeping out of debt, and placing the Society in a solid financial condition.

To give a better idea of our financial condition I give a summary of last year's settlement, adding money received since that report to the commencement of this meeting:

Summing up last year's report to time of meeting, paid	$47.53
Old order to secretary, unpaid	3.50
Total	$51.03
Received for membership fee at Red Oak meeting and since	$26.00
For "ads" in Report	8.00
Total	$34.00
Overpaid by secretary to last session	$17.03
Due society from Wm. Taylor, for "ad" in pamphlet	1.00
Received for membership fees for 1878 to date	25.00
Paid since last session, postage and expressage	7.35
Printing	.75
Including balance from last year, total	$25.13
Deduct amount received last session and since	$25.00
Due secretary	$ .13
Due the society from C. H. Dyer, to be paid by L. A. Williams	$ 1.00
Total due society	$ 2.00
Deducting amount due secretary, as above	.13
Leaving as funds to date	$ 1.87
Paid by Mr. Collman for J. Homan	1.00
Total	$ 2.87

Digitized by Google

A motion was made to appoint a committee to prepare a paper, as suggested in the Secretary's report.

Geo. Van Houten was selected as the person to make the report, and was ordered to have one thousand copies printed and distributed to the members.

Motion made and seconded that all of Art. II of the by-laws, after the word "qualified," be stricken out. Carried.

Considerable discussion was had on the subject of honorary members. It was finally decided that honorary membership only continued for the year it was conferred.

The subject of blight was introduced by H. C. Raymond, who thought it was caused by fungoid growth, and thought whitewash and sulphur was a preventative and would benefit the tree in other ways. Others differed from the President. The discussion was carried to quite a length but nothing really new was brought out. Mr. Bacon had tried whitewash but without apparent benefit as far as blight was concerned, but thought the health of the trees was improved.

Several subjects were assigned to different members to be discussed during the session.

On motion the Society adjourned until half past six o'clock in the evening.

Digitized by Google

EVENING SESSION.

Called to order at 6:30 P. M.

Rev. Collins was introduced, and lectured on the "Relation of Botany to Practical Horticulture." Spoke of the fallacy of a scientific education unfitting a person for horticulture or agriculture.

On motion Rev. Collins was unanimously tendered an honorary membership and a vote of thanks for his entertaining lecture.

The adoption of a fruit list was then declared to be in order. A lengthy discussion on the merits and demerits of different varieties of grapes followed. The talk was intended particularly for the benefit of the members, and it was decided to make no record of the result of of the deliberations.

A motion was made to proceed to designate the place of holding the next annual meeting. Several places were nominated. A vote was taken, and Atlantic was chosen as the place for the annual meeting for the second Wednesday in December, 1880.

The following were selected as the local committee: Silas Wilson, Arthur Brackett, and Thomas Hardenburg.

The society adjourned to nine o'clock next morning.

Digitized by Google

SECOND DAY.

The meeting was called to order, the officers all present.

On motion the reading of the minutes was dispensed with.

J. R. Rice spoke on "General Work of growing Nursery Stock, Digging and Packing for Shipment," also on the method of digging seedlings and grape vines, with suggestions on the best and cheapest way to plant small forest trees intended for timber or for sale. He gave some brief but explicit directions on this subject.

The subject of live fence posts was then introduced. Mr. McWilliams recommended walnut and objected to cottonwood. Mr. McWilliams said many of us were ready to fight the walnut on account of it sapping the ground and injuring anything planted near it, and he objected to live posts generally. He recommended fastening a picket to a tree and attaching the wire to the picket instead of the tree.

Mr. Collman recommended European larch for dry, and Scotch pine for low ground; also thought Ben Davis apple trees good for live posts.

Mr. Raymond thought that the catalpa, if the hardy kind could be procured, would make good live fence posts.

"What is a first-class tree and plant?" Introduced by George Van Houten. Considerable discussion ensued about apple seedlings and other plants.

"Arrangement and management of nursery," was introduced by Mr. Collman. Would harrow ground early in spring and then plow deep as possible; then harrow thoroughly and roll; thought this better than fall plowing; would have rows a certain length, to be known before grafts were put up, and have grafts enough to just fill the rows; would have avenues for drives through the nursery; would set burr oak stakes at end of rows; paint stakes, and while paint is yet fresh, write name of variety with ink pencil; make mark with marker; set grafts straight, and before weeds start, go over them with a wheel hoe; after grafts and weeds start use cultivator. Recommended thorough cultivation, but would not continue cultivation late in season. Early in

Digitized by Google

the fall sow oats between the rows for mulch. If trees failed to make first-class trees, dig up and burn. Also recommended ridging up trees for winter protection. Cultivation should begin early next spring, and weeds kept down the entire season. Thought a good thrifty two-year-old tree or a medium three-year-old tree the best to set. On being asked direction rows should extend, said they should run north and south, and should be planted nine to fifteen inches in rows four feet apart.

Mr. Bacon thought a three-year-old tree, slowly grown, was the best to plant.

After considerable discussion on general nursery management, the Society adjourned until one o'clock, P. M.

Digitized by Google

AFTERNOON SESSION.

Officers all present.

Mr. Wilson read an essay on the propagation of grape vines and seedlings. Samples of grape cuttings were shown; some were cut in a proper manner, others were exhibited showing the careless or improper manner of making cuttings practiced by other persons. Mr. Wilson was asked many questions about his method of putting out cuttings and taking up vines.

Several other members gave their methods of propagating grape vines; some advised cutting roots of grape vines when to be set in vineyard; some thought they ought to be cut back to six or eight inches; while others thought they ought to be cut longer.

Revision of apple list was declared to be in order. The following were retained: Ben Davis, Jonathan, Winesap, Roman Stem, Dominie, Talman Sweet, Janet, Iowa Blush, Walbridge, Lowell, St. Lawrence, Fameuse or Snow, Chenango Strawberry, Cole's Quince, Gros Pomier, Red Astrachan, Duchess of Oldenburg, Early Harvest, Red June, Sweet June, Sops of Wine, Wealthy; Crab's, Hyslop, Whitney's No. 20.

The following are recommended for extensive planting: Ben Davis, Jonathan, Winesap, Dominie, for winter. Fameuse and Lowell for fall. Duchess of Oldenburg and Red June for summer.

Cherry list adopted as follows: English Morello, Early Richmond, Late Richmond.

Plums: Miner and Forest Garden.

Grapes: Concord for general planting. Delaware requires winter protection.

Adjourned to 6:30 P. M.

Digitized by Google

EVENING SESSION.

The Society was called to order, President Raymond in the chair.

Mr. Raymond read an essay written by Prof. Budd, Secretary of the Iowa State Horticultural Society, on the topic, "Strawberry and Apple Blossoms." Considerable discussion followed the reading of the paper. Mr. Bacon thought the Crescent Seedling strawberry imperfect in blossom. Had good success in planting the Green Prolific, fertilized with the Wilson, planting five rows, the outside rows Green Prolific and the middle rows Wilson.

Mr. Williams had tried the Col. Cheney for several years, but had had no fruit from them. Had sown salt on strawberries with beneficial results.

Mulching and mulching material was discussed. Hay was recommended. Straw was not recommended on account of the grain growing up the next summer to the injury of the plants. The time to mulch is after the ground freezes in early winter.

Mr. Raymond then read an essay on "Fruit and Vegetable Canning." Considerable discussion ensued on the different degrees of ripeness and different methods of canning, after which the Society adjourned to meet at nine o'clock next morning.

Digitized by Google

THIRD DAY.

Officers all present.

The President appointed the following a committee on programme for the next meeting. L. A. Williams, Glenwood; A. F. Collman, Corning; Geo. Van Houten, Lenox.

The adoption of the fruit list was declared to be in order, and the following varieties were adopted:

Gooseberries—Downing, Houghton.
Currants—Victoria, White Grape, Red Dutch.
Blackberries—Snyder.
Raspberries—Mammoth Cluster.
Strawberries—Wilson, Green Prolific, Kentucky, Charles Downing.

On motion the Secretary was instructed to attach our fruit list as adopted and revised to the 1,000 copies of paper authorized, as shown in the minutes of the first day of this session.

L. A. Williams gave his method of picking and marketing fruit. Picked grapes as soon as ripe, which was when well colored; got at wholesale 4½ and 5 cents per pound.

Mr. Bonham was called upon, and gave his method of handling grapes. Packed in baskets, to be covered with netting or paper when sent to distant markets by express.

President Raymond thought apples should be picked early and put in a cool place to insure their keeping.

Mr. Bonham thought apple picking or time of picking should be carefully attended to.

On orchard management Mr. Bacon was called upon, and made some remarks.

Mr. Wilson noticed a small insect looking something like a chinch-bug that he thinks destroyed the blossoms on Ben Davis and Jonathan apple trees.

Mr. Bacon thought orchard trees should be headed five feet high, and although they looked high while young they would spread and be low enough when they acquired age; said Willow Twig needed severe

Digitized by Google

pruning. If large limbs on apple trees had to be cut off they should be cut with a saw, and the wounds covered with grafting wax.

The following preamble and resolution were unanimously adopted:

COUNCIL BLUFFS, IOWA, Dec. 12, 1879.

The Western Iowa Horticultural Society, in annual convention assembled, respectfully represent that our Society is doing a good work by disseminating useful information on fruit-growing and tree-planting. We also represent that we have been recognized by the State Horticultural Society, in that they have published a summary of our proceedings for two or three years past; therefore, be it

Resolved, That we respectfully ask our senators and representatives of the Iowa Legislature to set apart 100 copies of volume 14 of State Horticultural Reports — to contain our report for this year — for this Society for free distribution among our members.

All of which is respectfully submitted.

Digitized by Google

AFTERNOON SESSION.

Officers all present.

H. A. Terry read an essay on "Shrubs and Flowers." The paper was very interesting. Many questions were asked, and answered by Mr. Terry and others.

The Berberry was discussed, and members thought the purple variety fruited better than the other kinds.

Motion by J. R. Rice, seconded by Silas Wilson, that the Secretary be allowed fifteen dollars for services to date.

Carried.

Motion by A. F. Collman, seconded by Silas Wilson and Geo. Van Houten, that a vote of thanks be extended to the citizens of Council Bluffs for the hospitality and generous treatment extended to the members of our Society during the session.

Carried unanimously.

Motion made and carried that the Secretary be authorized to retain three dollars to pay for printing and other expenses in the near future.

Geo. W. Brewster, of Omaha, was called upon, and made a few remarks on timber-planting in Nebraska.

On motion the society adjourned, to meet at Atlantic, Cass county, on the second Wednesday in December, 1880.

GEO. VAN HOUTEN, *Secretary*.

Digitized by Google

THE CULTIVATION OF FLOWERS.

BY H. A. TERRY, CRESCENT CITY.

Mr. President and fellow members—The cultivation of flowers is a privilege, or rather luxury, that all may indulge in; the poor as well as the rich, although, of course, not to so great an extent. In the city those who rent, and have a little lot 50x100 feet, may have their plat of flowers, and cultivate a few annuals and bedding plants and reap a great amount of pleasure from a limited space of ground. Flowers are among God's best gifts to man, and man and woman naturally love and admire them.

The little child, before it becomes debased by the selfish ways of the world, loves flowers; and I doubt if there is a person within the sound of my voice that can say they do not admire the delightful fragrance and rich tints of the rose, or, in fact, of almost any other flower in the whole list.

In writing up flower culture it will be necessary to give a list of such varieties as are of greatest value and easily managed in the flower garden. One of the most popular flowers with all, and perhaps the one that should head the list, is the *Rose* in its different classes or families. But four of these classes are hardy enough to endure our climate in winter in the open ground, and to these only will I call attention.

Perhaps the most hardy class is the Summer or June roses, which contain some of the most fragrant and brilliant varieties in cultivation; then the Moss rose family, which are "just splendid"; then the Climbers, which all admire; and, lastly, the Hybrid perpetuals, or Remontants, which bloom at intervals throughout the summer. These roses are all called hardy, and will go through our winters sometimes without protection and come out unscathed in the spring; but it is safer to protect all roses, as the bloom will be much more abundant and finer for the protection. Perhaps the most simple and effectual way of protecting the rose is to bend down the shoots and confine them to the ground by pegs or weights across them, and cover with soil to the depth of a few inches. This protection should not be taken off until all danger of severe freezing is over in the spring. I have often seen

Digitized by Google

roses and other small plants protected by turning an empty barrel over them, or tying straw around them; but I have tried both these methods and found them ineffectual and not to be depended upon.

The next family of plants that I shall mention is the *Spirea,* which consists of many varieties and all hardy and well worthy of cultivation. Like the rose, a portion of these varieties bloom only once in the season, while others are perpetuals, blooming throughout the summer. The colors vary in shades from pure white to the brightest scarlet, and some of purplish hue.

Another class of shrubs that are old-fashioned, but none the less desirable, is the *Lilac* family, which originally consisted of two or three varieties, but which has been increased by seedlings until now we have a dozen or two of very fine sorts. The usual colors are white or shades of purple, though some of the newer varieties incline toward crimson, and the bloom is also much more abundant on the new varieties.

The *Syringa,* or Mock orange, is a beautiful shrub, all the varieties of which have white flowers, and most of them possess a delightful fragrance, quite equal to that of the orange flower. They are perfectly hardy and of easy culture. There are several varieties, and all beautiful.

Weigelia rosea—A fine shrub, three to five feet high, with pink, bell-shaped flowers in great abundance in early summer.

Snowball—Is another of our old-fashioned flowers, still it is one we must have in every collection. It is too well known to need any description here.

Purple-leaved berberry—Is a great favorite with all who have seen it growing. It combines the useful with the ornamental to a great degree. The fruit, of which it produces a great abundance, is very excellent for jelly, preserves, etc., while the foliage of the plant, which is of fine purple color, makes it a great acquisition for the shrubbery. It is hardy enough to endure the climate of Siberia.

The *Flowering almond,* of two sorts, one with pink flowers, the other with white; are both valuable shrubs. The white is the most rare, and has the largest and most perfect flowers.

The *Upright honeysuckle* is a fair shrub, growing six to eight feet high, and producing an abundance of flowers early in spring. There are several varieties; one sort with white flowers which produce yellow berries later in the season, and another kind with pink or reddish

Digitized by Google

flowers and red berries. The fruit of both sorts is very ornamental and hangs on the trees for a long time, but is not edible.

The *Flowering currant* is a very hardy shrub, with fragrant yellow flowers, which are often succeeded by fruit of excellent quality.

A beautiful dwarf shrub is *Hypericum elatum,* with fine yellow flowers in August. The foliage remains green on the plant until winter.

Rose acacia, or Moss locust—Is a dwarf shrub of great beauty, which blooms in May, and again in July or August. The flowers hang in dense pendent clusters of a bright rose-color.

Perhaps one of the most showy shrubs of recent introduction is the *Prunus trilobata,* or Double-flowering prune. It is after the style of the Flowering almond, though the flowers are twice as large, and are a bright scarlet, instead of pink. The flowers are borne in dense wreaths, and are remarkable for their great beauty.

Viburnum prunifolium—Is a fine shrub or dwarf tree in the snow-ball family, with beautiful foliage and clusters of white flowers early in spring.

Pyrus Japonica—Is a fine old shrub, but is rather tender, and requires protection sometimes during the winter; in fact it is better to protect it every winter. The flowers are brilliant scarlet, and appear very early in spring, before the foliage starts to grow.

In hardy climbing shrubs we have the *Clematis Virginiana*, a native, but all the more valuable for that. It produces a great abundance of white flowers in summer, which are succeeded by seeds with feathery appendages, which are quite ornamental, in the fall.

Virginia creeper—Is another native climber of great beauty, prized for its foliage alone, as its flowers are inconspicuous and possess no great beauty. The foliage is remarkable for its brilliant scarlet tints in autumn.

Trumpet creeper—Is perhaps the best and most showy of our hardy climbers, with large, dark red, trumpet-shaped flowers produced in great abundance all the season.

The *Honeysuckles* of some half dozen sorts are all fine climbers and produce neat, showy flowers during a great portion of the summer. The colors of the different varieties are white, yellow and scarlet.

Of hardy herbaceous plants the Pæonia takes the lead as being the most showy and also the most easily managed. The varieties are very numerous and are increasing every year, though the improvement in

Digitized by Google

the flowers is not so great as in some other families of plants. Some flower dealers count their varieties of Pæonias by *hundreds*, though it is likely that of those collections twenty-five to fifty sorts would embrace about all the distinct colors and forms. Autumn is the proper time for transplanting the Pæonia, and as an evidence of its perfect hardiness, I will say that I have never known a plant of it to be winter-killed, whatever the exposure. The colors are similar in the Pæonia family, to those of the Rose, being white, scarlet, straw, purple and crimson; and in some varieties nearly all these colors combine. There is as yet no *blue* Pæonia.

The perennial *Phlox* is a class of very hardy and showy plants, of easy culture, and continue in bloom for a long time.

One of the most showy flowers that we have, and a favorite with nearly every one that sees it, is *Campanula grandiflora.* The flowers are very large, one variety is of deepest blue, another of pure white. There are also double varieties of both colors. The flower stalk is about two feet high, and is in bloom most of the summer. The plant seems peculiarly adapted to our soil and climate, and really ought to be in every collection.

Another fine plant is the *Pentstemon* of several varieties, which are rendered more valuable for being natives of the Missouri Slope, and which produce purple and scarlet flowers of great beauty.

Dicentra or Bleeding-heart is another plant of great beauty, and is withal very hardy and of easy culture. There are two varieties, and both worthy of general cultivation.

The following hardy perennials are all worth cultivating, but space will not permit me to describe each at length, viz.: *Columbine*, in varieties; *Iris,* several sorts; *Pinks*, of many varieties; *Pulmonaria,* or blue bells; *Callirrhoe*, two colors; *Lophanthus*, delightfully fragrant; *Baptisia*, two varieties; Flowering *Flax,* two colors; *Day Lilies*, several sorts; *Blackberry Lily; Tritoma grandiflora; Bocconia cordota; Geranium sanguineum; Lychnis*, all are good; *Clematis,* two colors; *Verbena Montana*, hardy; *Astilba Japonica; Convallaria,* or Lily of the Valley; and our old fashioned *Ribbon Grass.* Any and all the above named plants are hardy enough to endure our winters, and pretty enough for any flower garden, and are grown with so little trouble that any one may have them.

Of hardy bulbs that may be planted in autumn, the Lilies of several varieties, and Tulips in all their varieties, are about the only ones that

Digitized by Google

succeed well in the open ground. The Lilies also do well planted in spring.

Of tender bulbs and tubers, to be planted in spring, I will call attention to the *Gladiolus*, the varieties of which are very numerous and nearly all are good, but to have good flowers of Gladiolus, one must have good soil and give the plants good cultivation, and then they will not be disappointed.

The *Dahlia* is a tuberous rooted plant that seems well adapted to our soil and climate. There are many varieties and the colors are very rich and brilliant, being white, yellow, scarlet, crimson and purple. Other spring bulbs are the Tuberose, Amarillis, Oxalis, etc.

The cultivation of these bulbs is attended with no difficulty, only that they require good soil, which should be kept mellow and free from weeds.

In conclusion, I may say that I feel it my duty to advise all my friends, and in short all concerned, to plant more flowers and ornament and adorn their homes to a greater extent and their children will *grow* and call them "blessed."

PROPAGATION OF GRAPE VINES AND FRUIT STOCKS.

BY SILAS WILSON, ATLANTIC.

Mr. President and fellow members—In order to propagate grape vines successfully we must understand the nature of our soil. Our soil being of light porous nature, it is particularly adapted to growing strong well-rooted plants. I have had some twelve year's experience in propagating vines in our trying climate. I claim to have found many new things. I differ very much from many of my fellow nurserymen in preparation of cuttings. I will here exhibit three classes of cuttings, Nos. 1, 2, and 3. No. 1, represents my method of making cuttings. My experience has taught me to plant nothing but good strong cuttings. I once planted about 65,000 Concord cuttings of

Digitized by Google

class 3, and after giving them the best attention, at one year old I was ashamed of them, at two year's old I dug them and had all told about 8,000 plants. I don't believe there are five members of this Society that could have classed them. Cuttings should be prepared in November or December, tied in bunches of one hundred each, with willow and placed in a cellar in damp saw-dust or earth, until early spring, then planted in the following manner: Plow your ground ten to twelve inches deep, harrow it well, making it as level as possible, then stretch a line tight and stick the cuttings close to the line four or five inches apart in the row, and the rows three feet apart. Stick the cutting down deep, leaving the top bud exposed to the sun. This method will produce good vines, if given good cultivation, of all varieties that will grow from cuttings in open ground. Delaware and other kinds that will not grow readily from cuttings in open ground, can be placed under glass in bunches, tops down and buts up, kept moist with about one inch of earth over the cuttings; in a short time they will commence to send forth delicate roots, then they should be at once transplanted to the nursery rows with care.

The growing of fruit stocks seems to be more difficult every year; young plants from seed have many enemies. Insects commence preying upon them as soon as the plant is visible above ground, and continue to do so until the seedlings are dug in the fall. Ground should be plowed in the fall very deep. However, it is not necessary to plow as deep for apple seedlings in western Iowa, as it is further east. Our subsoil is very loose, and in our dry, warm summer and fall, the roots will go deep. Apple seed should be planted in February or as early in March as possible. I always get a better stand of plants when planted early. I soak apple seed twelve to twenty-four hours previous to planting if planted early, if not, I soak three to five days. The rows should be about two feet and a-half apart, mark the ground with a single shovel plow or a marker, as you may choose, drill the seed by hand, planting one bushel and a-half per acre, covering with a hoe. Apple seed will grow at a lower temperature than weed seed, hence, it affords you a splendid chance to get the inside track of the weeds. Apple seedlings should have good cultivation, and should be cultivated until frost kills the weeds. Seedlings will grow well after light frosts. They should not be dug until hard frosts come. After being dug great care is necessary to keep them from being dried or from heating. Apple seedlings are very easily damaged when they are first dug, being green and full of sap. Pear seedlings can be grown very successfully

Digitized by Google

with the same treatment as that of apple. Cherry seedlings, both Mazzard and Mahaleb, can be grown here to perfection. In fact they grow too large for grafting or budding unless planted very thick. Mr. Hoover, of Dayton, Ohio, told me last fall that the principal objection to American grown Mahaleb stocks was that they were too large to be profitable. The Mahaleb is more difficult to germinate than Mazzard. I generally import my own cherry pits from France. My Mahaleb usually arrives in October, the Mazzard always come later in the fall. I place them as soon as received in damp sand, and keep them in cellar until spring for planting. Plum pits may have the same treatment as that of cherry. Native plum pits grow more readily than imported seed.

STRAWBERRY AND APPLE BLOSSOMS.

BY J. L. BUDD, AMES.

Mr. President and members of Western Horticultural Society— On my return from the annual meeting of the Eastern Society, at Muscatine, I found programme of meeting of Western Society immemediately following. These meetings follow so closely that other pressing duties prevent my being with you, and give me but little time to prepare notes of observation and experience in a connected way. Very briefly I write, to present for your consideration, some notes on the texture and varied grades of perfection of the blossoms of the strawberry and apple.

My extended correspondence and observation lead me to believe that the majority of our nurserymen and fruit-growers do not give the attention to this subject that its importance demands. Our nurserymen usually grow several varieties of the strawberry in near contiguity, and too many of them sell plants of Green Prolific, Ida, Colfax, Crescent Seedling, Russell, etc., in blissful ignorance of the fact that they will produce little, if any, fruit unless planted adjoining varieties producing a plentiful stock of pollen. Hence, we find, in every neighborhood of the State, a number of families earnestly trying to grow this lus-

Digitized by Google

cious fruit, and wondering why some of their neighbors, more fortunate in purchasing plants, are more successful. If the nurseryman performed his whole duty to his customers, our planters would soon learn to watch the strawberry blossoms for themselves.

Again, we have many varieties of the strawberry perfect enough in flower in the moister air of Michigan and New England, yet feeble in stamens on the prairie. For instance, we have much discouragement as to the behavior of the Charles Downing. With us it is feeble in stamens, and usually produces a scant supply of pollen. If the bed is isolated and the weather is unfavorable at the time of blossoming, the crop will be trifling, while beds adjoining Wilson or Downer will be loaded with berries hard to excel, either in size, uniformity or flavor.

Among the many new varieties now being crowded on public notice, we find a number having, in our dry air, imperfectly developed stamens. We wish to insist that nurserymen at least should form their own opinions as to the character of flower, irrespective of the claims of originators, newspaper or book reports.

To still other points should our nurserymen and extended growers give special attention. Some of the new varieties are of the Triumph de Gand class. That is, they are tinctured with the South American species *(Fragaria grandiflora)*. All of these are delicate in leaf and delicate and fragile in flower. If perfect in all the parts of the flower and the plants are in good order in the spring, the crop is quite sure to be destroyed by phases of weather, at the time of blossoming, that would not affect such models of perfection as Downer or Kentucky. As a rule, the variety possessing a leaf that can bid defiance to wind and weather, develops flowers of the same strength and texture. On the other hand, the fragile leaf is accompanied with the fragile flower. I wish to add the suggestion that strawberry blossoms need study as to time of opening and the character of the pollen used in fertilizing. As to time of flowering, I only need to say that it will not do to plant Kentucky to fertilize Green Prolific or Col. Cheney. Though producing an abundance of pollen, the Kentucky is too late in expanding its flowers. As to character of pollen, I will throw out the fact, as a hint for discussion, that the Green Prolific, fertilized by Downer's Prolific, is better in quality than when fertilized by Wilson, but it is not so highly colored. If our nurserymen and large growers would carefully study all these peculiarities of blossom, our people at large would soon know more of strawberry culture.

Digitized by Google

A little careful study at the proper season will convince any one that the apple blossoms are not uniform as to ability to endure the rough storms and changes of temperature of the season in which they expand on our prairies; neither are they uniform as to perfection of their stamens. The subject is by no means new, yet it seems to escape the attention of most of our nurserymen and orchardists. In Europe it has been recorded in the horticultural journals for many years that some varieties of the apple were stronger in texture of blossom and better able to withstand frost and storm than others. In Iowa, our fruit growers for years have noted the fact that storms or frosts, that destroy the blossoms of most varieties, do little harm to the blossoms of such sorts, of northern origin, as Duchess, Gros Pomier, Plumb's Cider, or Wealthy. Yet not one in a thousand give the question the careful study enabling them to announce that such varieties as have a thick epidermis of leaf and bark, are equally notorious for petals of firm texture, and for strength and perfection of stamens and all parts of the flower. Taking the Duchess as a standard of perfection in apple blossoms, a few minutes devoted to comparison with the flowers of sorts more fragile in leaf and flower, will teach any one with good eyes the lesson we wish to impress. Not only will such comparisons show that varieties differ in texture and strength of all the parts of the flower, but the fact will become apparent that many well known varieties bear flowers which in our climate are defective in anthers and supply of pollen. In a mixed orchard, the varieties with defective stamens may be fertilized by adjoining trees and produce fruit. But it so happens that in a majority of cases, the varieties with defective stamens are fragile in blossom, in all its parts, and the storms and unfavorable weather apt to occur at this season are quite certain to destroy them. I may note that apple blossoms may profitably be studied from another standpoint. The oriental species, from which are beyond doubt derived all the varieties hardy on the prairies, are distinguished by their peculiar structure, size and color of the blossoms. In this respect they often serve as a guide in tracing the origin of our varieties. Indeed, varieties from all sources are so varied in structure of the blossoms that Prof. Beal, of Michigan, proposes to make use of them in the classification of varieties.

To these suggestions we will add, with a view to drawing out discussion, that the horticulturist may learn valuable lessons from the study of the blossoms of *many* of our plants and trees. For instance, we have some reason to believe that asparagus plants bearing the pistillate

Digitized by Google

flowers are less valuable than the staminate ones, and that it would pay to propagate the latter by division.

We have reason also to believe that the staminate plants of the Norway spruce have but little value for ornamental trees, while the pistillate ones start earliest in the spring, and at all seasons are objects of beauty, with proper training.

We again have reason to believe that the so-called yellow cottonwood is no more, nor no less, than the staminate trees of which the white cottonwood are the mates. If this be true, it will be important to grow our trees from cuttings, rather than from seed.

The staminate trees of the box elder we also find most rapid in growth and beautiful in outline. Will or will it not pay to grow this also from cuttings? This question is the more important as we have much complaint of late that this tree is a nuisance on account of the seedlings springing up by the hundreds in the vicinity of the pistillate trees.

I might add very many other examples to show the vital importance of cultivating habits of close and accurate observation.

Digitized by Google

CONSTITUTION

OF THE

IOWA STATE HORTICULTURAL SOCIETY,

AS ADOPTED AT DES MOINES, JANUARY 10, 1868.

ARTICLE 1. This society shall be called the Iowa State Horticultural Society, and shall have perpetual succession.

ART. 2. The objects of this society shall be the promotion and encouragement of horticulture and arboriculture by the collection and dissemination of correct information concerning the cultivation of such fruits, flowers, and trees, both deciduous and evergreen, as are adapted to the soil and climate of Iowa.

ART. 3. The officers of this Society shall consist of a President, one Vice-President, a Secretary, Treasurer, and twelve Directors, who together shall form a Board for the general supervision of the affairs of the Society. The officers shall be elected annually at such time and place, and in such a manner as the Society may determine at the time and place of holding its annual exhibition in January, except the Directors, who shall be chosen biennially. Those from the First, Third, Fifth, Seventh, Ninth, and Eleventh Districts, one year, and those from the remaining districts the succeeding year. Said board may adopt such by-laws as shall be deemed necessary for the benefit of the Society, and not inconsistent with this Constitution and the laws of the State of Iowa, and change the same from time to time.

ART. 4. The Secretary shall keep an accurate and full account of the proceedings of the Society. He shall also open and carry on a correspondence with such Fruit-growers, Florists, and Horticulturists in general throughout the State as manifest an interest in the purposes of the Society. He shall annually make up a report for publication, em-

Digitized by Google

bracing such information upon fruit-growing as may come within his reach, with a full report of the business affairs of the Society, and he shall be allowed a reasonable compensation for his services.

ART. 5. The Treasurer shall have charge of the funds and other property of the Society, and dispose of them as decided by the board of officers. He shall pay out no money except upon the order of the President and countersigned by the Secretary. He shall make up a full and true report of all money and other property put into his hands for the benefit of the Society, with disbursements and vouchers, annually, and present the same to the Secretary on or before the first day of the meeting in January, and shall be required to give bond in such sum, and with such securities, as the board shall direct, which bond shall be approved by the President and filed with the Secretary.

ART. 6. All accounts brought against the Society shall be audited by the board.

ART. 7. The members present, of the board, shall constitute a quorum for the transaction of business at any regular, called, or adjourned meeting.

ART. 8. Any person may become a member of this Society by the annual payment of one dollar.

ART. 9. The fiscal year shall commence and end at the January meeting of each year, and the retiring board shall settle the business of the previous year.

ART. 10. This Constitution may be amended at any annual meeting by a majority of the members present.

BY-LAWS.

ADOPTED JANUARY, 1869.

1st. The officers of this Society shall be elected on the evening of the second day of January meeting, annually.

2d. The officers of this Society shall hold their respective offices until their successors are elected and qualified, except the term of the office of Secretary, which shall terminate on the first Monday of April following, at which time he shall forward his books and papers to his successor.

Digitized by Google

3d. The first business of the meeting of this Society shall be on each morning, the reading of the minutes of the previous day's proceedings, and submitting the same to the approval of the meetings.

4th. The President (and in case of his absence, the Vice-president), Secretary and Treasurer, shall constitute an executive committee, who shall perform any business deemed necessary for the benefit of the society, in the absence of the board.

5th. The annual membership shall cease on the day preceding the first day of the annual meeting of the Society in January.

6th. These by-laws may be amended at any general meeting of the Society by vote of a majority of members present.

Digitized by Google

LAWS OF STATE OF IOWA RELATING TO HORTICULTURE.

ACTS OF FOURTEENTH GENERAL ASSEMBLY.

CHAPTER 25.

AN ACT for the Encouragement of Horticulture and Forestry.

SECTION 1. *Be it enacted by the General Assembly of the State of Iowa*, That the present officers and directors of the State Horticultural Society shall hold their respective offices until the third Tuesday in January, one thousand eight hundred and seventy-three, and until their successors are elected as hereinafter determined.

SEC. 2. It shall be the duty of the said society to encourage the organization of district and county societies, and to give them representation in the State Society, and in every proper way to further the fruit-growing and tree-growing interests in the State.

SEC. 3. Said society shall hold its annual meeting on the third Tuesday in January, in each year, for the transaction of its business, at which meeting officers corresponding in numbers and titles to the State Agricultural Society, shall be elected, and for like periods of time. The place of holding the next annual meeting, and the times and places of holding exhibitions, shall be determined, premiums on essays may be awarded, and all questions relating to the horticultural development of the State may be considered.

SEC. 4. It shall be the duty of the Secretary of said Society to make an annual report to the Governor of the State, embracing the proceedings of the Society, with a bill of items showing for what purpose the money herewith appropriated was paid out for the past year; the general condition of horticultural pursuits throughout the State, together with such essays, statements of facts, and recommendations as they may deem useful, to be published by the State under the supervision of the society.

SEC. 5. The number of copies of said report to be published by the State, shall be limited to three† thousand copies, all of which shall be bound in a style uniform with the reports of said society for the years 1869 and 1870, and shall be distributed as follows: Ten copies

† Two thousand additional copies authorized by the Eighteenth General Assembly.

Digitized by Google

each to the Governor, Lieutenant-Governor, Secretary of State, Auditor of State, State Treasurer, Register State Land Office, Attorney-General, Judges of the Supreme Court, and to the members of the General Assembly. Two hundred copies to the Iowa State Agricultural College; five copies to the Iowa State University; five copies to the Iowa State Agricultural Society; two copies to each incorporated College in the State; one copy each to the Auditor and Clerk of the District Court of each county, to be kept in the office, and one copy to each newspaper published in the State. The remainder to be distributed by direction of said society.

SEC. 6. That the sum of one thousand dollars be appropriated annually, for the use and benefit of said society, and shall be paid by the Auditor of State, upon the order of the President of said society, in such sums and at such times as may be for the interest of such society: *Provided*, That two hundred dollars of the amount appropriated by this act shall be awarded in premiums for the growing of forest trees in this State.

Approved, April 6th, 1872.

Digitized by Google

CATALOGUE OF 1879.

At the annual meeting in January, 1880, C. L. Watrous, J. L. Budd, and G. B. Brackett were elected a committee to prepare a condensed descriptive catalogue of the cultivated, and desirable native fruits and nuts of the State for publication in the Annual Report of 1880. To prepare a satisfactory catalogue of this kind will require time, and the aid of our members throughout the State.

In the meantime it is thought best to present a list of the leading apples grown in the State.

The varieties marked with * are on the recommended list of the district noted at the top of the column. As an example of reading of catalogue: Alexander—size, large; form, roundish conic; color, red; quality, good; season, September and October; origin, Russia; on a scale of 1 to 10 it is marked, for dessert, 2; cooking, 10; market, 4; it is not starred, so is not found on recommended list in either district. Under head of Remarks: Tree is hardy, vigorous, spreading, and growing more productive and profitable as it attains age.

The next on the list (Benoni) has the description in same order, and is starred in column for central district, showing that it is on the recommended list of that district.

Digitized by Google

SECTION I—APPLES.

ABBREVIATIONS EMPLOYED.

Size.

l. large.
m. medium.
s. small.
v. very.

Form.

c. conical.
f. flattened.
o. oblong.
ob. oblate or obtuse.
ov. oval or ovate.
r. roundish.

NUMBER.	NAMES.	DESCRIPTION.					
		Size.	Form.	Color.	Quality.	Season.	Origin.
1	Alexander	l.	r. c.	r.	g.	Sept. Oct.	Russia.
2	Autumn Strawberrry	m.	r. c.	s. w.	v. g.	Oct. Nov.	N. Y.
3	Benoni	m.	r. ob. c	y. d. c.	v. g.	Aug. Sept.	Mass.
4	Ben Davis	l. to m.	r. c.	y. r.	g.	Dec. to Mar.	Ky.?
5	Belle du Havre	l. to m.	r. ob.	g. y. r.	v. g.	Sept.	France.
6	Cole's Quince	l.	r. ob.	g. y.	v. g.	Sept.	Maine.
7	Cbenango Strawberry	m. to l.	o. c.	w. c.	v. g.	Sept.	N. Y.
8	Cracking	l.	oblate	g. y.	v. g.	Sept. Oct.	Ohio.
9	Canada Reinette	l.	o. b,	y. r.	v. g.	Dec. to Jan.	Europe.
10	Clyde Beauty	l.	r. c.	y. r.	g.	Oct. Jan.	N. Y.
11	Colvert	l.	o. b.	y. r.	g.	Oct. Nov.	Am.
12	Dyer	m. to l.	r.	g. y. r.	best	Sept. Oct.	Europe.
13	Dominie	m. to l.	r. ob.	g. r.	v. g.	Dec. Apr.	?
14	Early Pennock	l.	r. c.	y. r.	g.	July. Aug.	?
15	Early Joe	s.	ob. c.	y. r.	best	Aug. Sept.	N. Y.
16	Early Harvest	m.	r. ob.	y. w.	best	July. Aug.	Am.
17	English Golden Russet	m.	r. ob.	y. ru.	v. g.	Jan. Feb.	N. Y.
18	Fall Orange	l.	r.	y. r.	v. g.	Sept. Oct.	Mass.
19	Fameuse	m.	r. ob.	w. r.	v. g.	Oct. Nov.	Canada.
20	Fall Wine	m.	r. ob.	r. y.	best	Sept. Oct.	Am.
21	Fulton	l.	r. ob.	y. r.	best	Nov. Dec.	Illinois.
22	Gros Pomier	m.	r. ob.	y. r.	g.	Nov. Dec.	Sweden
23	Grimes' Golden	m.	r. ob.	g. y.	v. g.	Dec. Jan.	Va.
24	Genesee Chief	l.	r. c.	w. c.	g.	Aug. Sept.	Am.
25	Iowa Blush	s.	r. c.	w. r.	v. g.	Nov. Dec.	?
26	Irish Peach	m.	r. ob.	g. r.	v. g.	Aug.	Rus.?
27	Iowa Russet	m.	r. ob.	y. rus.	v. g.	Jan. Mar.	Iowa.
28	Jonathan	m. s.	r. c.	y. r.	v. g.	Nov. Feb.	N. Y.
29	Jersey Sweet	m.	r.	y. r.	v. g.	Sept.	Penn.
30	Jewett's Red	m.	r. ob.	g. c.	g.	Nov. Feb.	N. H.

Digitized by Google

SECTION I—APPLES.

ABBREVIATIONS EMPLOYED.

Color.

b. brown. *o. orange.* *s. scarlet.*
c. crimson. *p. purplish.* *v. vermilion.*
d. dark *r. red.* *y. yellow.*
g. green. *rus. russet.* *w. whitish.*

Quality.

b. best.
g. good.
v. very.

Numbers.	Use and Value. Scale 1 to 10. Dessert.	Cooking.	Market.	Locality. North.	Central.	South.	Remarks.
1	2	10	4	....	...	....	Tree hardy, vigorous, spreading, growing more productive and profitable as they attain age. *Not on list.*
2	8	4	6	....	*	..	Tree moderately hardy in central district and productive. Not generally known. *On central list.*
3	8	6	7	....	*	*	Is profitable, and tree hardy on dry, light-colored soils. Is rarely profitable on prairie soils. On central and southern lists.
4	8	6	9	*	*	*	Generally distributed and well known. On the three lists, but at the north should be top-worked.
5	5	8	8	....	....	....	Tree hardy; bears young. Does well on the prairies of central district.
6	5	8	7	*	*	....	Trees bear young, but do not attain great age on prairie soils. At north is better top-worked.
7	8	3	7	....	*	....	Trees do best on light colored soils. Fruit variable in size. Better for show apples than profit.
8	8	8	8	....	....	*	It is not on central list, but is profitably grown on bluff soils and top-worked on hardy stocks.
9	8	5	8	....	....	....	Not on lists, but quite favorably known in many sections of central and southern districts.
10	6	7	8	....	....	...	Likely to prove profitable in central and southern districts. North it is fully as hardy as Ben Davis.
11	4	7	7	....	....	....	Profitable so far as tried in central district east of divide.
12	10	8	4	....	*	*	This is not on northern list, but is much grown, mostly by top-working.
13	6	8	8	....	*	*	In the central district the Dominie is short lived on the prairie unless top-worked.
14	6	4	8	....	*	....	Trees fail in the trunks. No variety we have on our lists will pay better for top-working.
15	10	6	4	....	*	*	The tree seems hardy and has a good leaf. It is a poor grower in nursery, hence is top-worked.
16	8	8	7	....	*	*	Tree quite hardy, but on prairie soils rarely profitable on account of sparse bearing.
17	8	8	8	....	....	....	Not on list, but is profitable where known; unlike other Russets its young shoots are brown, speckled.
18	8	8	8	....	*	.	Profitable on bluff soils. Does well on hardy stocks at the north.
19	8	6	6	*	*	*	One of our most widely disseminated sorts. Not quite hardy north.
20	7	6	2	....	*	*	Does well in central district top-worked.
21	9	9	9	....	....	....	Introduced at an early day. Not hardy enough root-grafted for open exposures, even south.
22	5	9	6	*	*	....	Will be more popular when better known. Tree perfect; fruit good for dessert if ripened in cellar.
23	9	7	9	....	....	*	It is grown profitably in central district top-worked, and is doing well north on the crab.
24	7	9	7	...	...	...	Not on list, but the trees in central district in bearing are very satisfactory.
25	7	6	4	*	....	....	On the northern list for trial. Tree hardy, but fruit too small for market.
26	8	8	4	....	....	....	This famous English apple is an iron-clad here, and will be prized when better known.
27	6	6	8	...	....	....	Very promising. On list of Eastern Society.
28	8	8	8	*	*	*	On account of its quality this favorite variety is on northern list for top-working.
29	9	6	6	....	...	*	The tree is far from hardy in central and northern districts.
30	7	6	5	....	...	...	Not well known. Top-worked it is quite hardy on northern prairies.

Digitized by Google

SECTION I—APPLES—CONTINUED.

NUMBER.	NAMES.	DESCRIPTION.					
		Size.	Form.	Color.	Quality.	Season.	Origin.
31	Keswick Codlin	m. l.	ob. c.	g. r.	g.	Sept.	Eng.
32	Lowell	l.	r. o. c.	g. y.	v. g.	Sept. Oct.	Penn.?
33	Lansingburg	m.	c.	y. r.	g.	May.	Ohio.
34	Monmouth Pippin	l.	oblate	y. r.	v. g.	Nov. Jan.	N. J.
35	Maiden's Blush	m. to l.	r. ob.	y. r.	g.	Sept. Oct.	N. J.
36	Mother	m. l.	r. c.	y. r.	b.	Oct. Nov.	Mass.
37	Northern Spy	l.	r. c.	y. r.	b.	Nov. Dec.	N. Y.
38	Oldenburg	m. l.	r. ob.	y. r.	g.	Sept.	Russia.
39	Plumb's Cider	m.	r. c.	g. r.	v. g.	Nov. to Jan.	Wis.
40	Pewaukee	l.	r. ob.	y. r.	g.	Dec. Jan.	Wis.
41	Porter	m. l.	ob. c.	y. r.	v. g.	Sept.	Mass.
42	Paradise Winter Sweet	l.	r.	y. w.	g.	Dec. Jan.	Penn.
43	Red Astrachan	m. l.	r.	y. r.	g.	Aug.	Russia.
44	Red June	s.	ob. c.	y. r.	v. g.	July. Aug.	Am.
45	Ramsdell Sweet	m. l.	ob. c.	r.	v. g.	Oct. Jan.	Eng.
46	Rawle's Janet	m.	r. c.	y. r.	g.	Feb. Mar.	Va.
47	Roman Stem	m.	r.	y. b. rus.	v. g.	Jan. Mar.	N. J.
48	Red Stripe	m.	r. o.	y. r.	g.	Nov. Jan.	Ohio.
49	Rambo	m.	f.	y. w. r.	v. g.	Oct. Feb.	N. J.?
50	Rome Beauty	l.	r.	y. r.	g.	Nov. Dec.	Ohio.
51	Romanite	s.	r. ob.	y. r.	g.	Jan. Mar.	Va.
52	Sops of Wine	m.	r.	y. r.	g.	Sept.	Europe.
53	Sweet June	m. l.	r.	g. y.	g.	Sept. Oct.	Ohio.
54	Saxton	m.	r.	y. r.	g.	Sept.	Wis.?
55	Sheriff	s.	r.	y. r.	g.	Nov. Jan.	Ill.?
56	St. Lawrence	l.	ob. c.	y. c.	v. g.	Sept.	Am.
57	Striped Pippin	m. l.	r. ob.	s. r.	v. g.	Oct. Nov.	Ky.?
58	Smoke House	m. l.	r. ob.	y. c.	g.	Sept. Jan.	Penn.
59	Sweet Pear	m. l.	r. c.	y. b.	v. g.	Sept. Oct.	?
60	Soulard	m. l.	ob. c.	w. r.	v. g.	Oct.	Mo.
61	Tetofsky	m.	ob. c.	y. r.	g.	Aug.	Russia.
62	Talman Sweet	m.	r.	w. y. r.	g.	Nov. Jan.	R. I.
63	Utter's Red	m. l.	r. ob.	w. r.	v. g.	Sept. Oct.	Ill.
64	Vandevere Pippin	l.	ob.	y. r.	g.	Nov. Dec.	Penn.?

Digitized by Google

SECTION I—APPLES—CONTINUED.

NUMBER.	USE AND VALUE. Scale 1 to 10. Dessert.	Cooking.	Market.	LOCALITY. North.	Central.	South.	REMARKS.
31	2	10	7	....	....	....	Profitable on bluff soils in central and southern districts.
32	6	6	8	....	*	*	In central district this is on the list as profitable only when top-worked.
33	4	4	6	....	*	*	This variety is quite popular as a very late keeper of quality better than Gilpin.
34	7	7	7	....	....	....	Very promising where grown in central district.
35	5	7	9	....	*	*	In central district is on list for top-working. One of our most popular fall apples.
36	8	7	7	....	*	*	Recommended top-worked in central district.
37	9	8	9	....	....	...	Not on lists as it is supposed to be very tardy in coming into bearing. Worthy of trial top-worked.
38	3	9	9	*	*	*	A favorite in all parts of the State.
39	6	7	8	*	....	....	This variety will be more generally planted when better known.
40	6	8	8	*	....	....	Likely to become a popular variety. To be top-worked at extreme north.
41	8	7	7	....	....	*	Not widely disseminated. Seems hardy where grown in central district.
42	6	5	2	....	....	....	Does well on bluff soils in central district.
43	4	9	9	*	*	*	Tree hardy over a great portion of the State, but on most soils a moderate bearer.
44	5	8	5	....	*	*	Would prove desirable and profitable were it less subject to scab.
45	8	6	8	...	*	*	Should be top-worked more extensively in the central district.
46	4	2	4	....	*	*	On hardy stocks the fruit has proven more even in size even in southern district.
47	7	7	4	....	*	*	Profitable and desirable for home use.
48	4	5	4	....	....	*	But little disseminated in central district.
49	7	6	5	...	....	*	Will pay in central district top-worked.
50	6	7	5	....	....	*	About like Rambo as to hardiness.
51	3	2	3	....	...	*	Grown mainly for cider. Not hardy north unless top-worked.
52	4	6	6	....	*	....	Not very profitable on the prairies.
53	4	2	2	....	*	*	Grown mainly in small quantity for home use.
54	4	3	4	....	*	*	Tree hardy and bears young.
55	4	4	4	....	*	*	Hardiness of tree is a principal merit.
56	8	8	9	....	....	*	This variety should be on northern and central lists. It is successfully grown north.
57	6	5	8	....	...	*	Does well in central district on dry bluff soils.
58	5	7	8	....	....	*	Does well top-worked in central district.
59	7	4	5	....	....	...	Not on lists, but more or less grown over the State. Tree hardy, but blights.
60	8	8	8	....	....	....	Well liked where known in central district.
61	5	7	3	*	*	....	Tree iron-clad, but not a profuse bearer. Does best on moist lands.
62	4	8	4	*	*	*	On all the lists, but not found profitable for market in any part.
63	6	6	8	*	*	*	One of our best autumn varieties.
64	4	6	5	....	....	....	Quite widely disseminated, but not profitable.

Digitized by Google

SECTION I—APPLES—CONTINUED.

NUMBER.	NAMES.	DESCRIPTION.					
		Size.	Form.	Color.	Quality.	Season.	Origin.
65	Williams' Favorite	m.	r. o. c.	r.	v. g.	Aug. Sept.	Mass.
66	White Winter Pearmain	m.	c.	y. b.	best	Dec. Jan.	?
67	Wealthy	m. l.	r.	y. r.	v. g.	Oct. Jan.	Minn.
68	Willow	m. l.	r. c.	y. r.	g.	Dec. Mar.	Am.
69	Westfield Seek-no-further	m. l.	r. c.	y. r.	best	Oct. Feb.	Conn.?
70	Walbridge	m.	r. c.	y. r.	v. g.	Jan. Feb.	Illinois.
71	Winesap	m.	r. ob.	y. r.	v. g.	Jan. Feb.	Am.
72	Wagener	m.	r. ob.	y. c.	v. g.	Nov. Jan.	N. Y.
73	Wolf River	l.	ob.	y. c.	v. g.	Nov. Dec.	Wis.
74	Whitney No. 20	s.	r.	y. c.	best	Sept.	Illinois.
75	Yellow Bellflower	l.	ob.	y. r.	v. g.	Nov. Jan.	N. J.

Digitized by Google

SECTION I—APPLES—CONTINUED.

Nurser.	Use and Value. Scale 1 to 10. Dessert.	Cooking.	Market.	Locality. North.	Central.	South.	REMARKS.
65	6	5	8	....	....	....	Not on lists, but widely grown. Tree hardy in central district.
66	9	6	4	....	...	....	Would be profitable south for home use were it not subject to scab.
67	6	6	9	*	*	...	A perfect iron-clad, and widely disseminated for a new variety.
68	5	7	7	*	*	*	To be top-worked north. Tree subject to blight in dark soils.
69	7	3	6	....	*	....	Does well top-worked in prairie orchards in central district.
70	6	5	5	*	*	....	One of our hardiest and best late-keeping varieties for the north.
71	6	6	4	....	....	*	Only profitable on rich soils, with porous, well drained subsoils.
72	8	4	5	...	....	*	Trees are short lived in most parts of the State unless on hardy stocks.
73	6	8	8	....	....	....	Promising as a strict iron-clad. Evidently of Russian descent.
74	8	2	8	*	...	....	Usually listed with the crabs, but really a choice little dessert apple. Iron-clad.
75	8	10	8	....	....	....	Extensively tried, but not found profitable except in favored localities.

Digitized by Google

Digitized by Google

REPORT OF COMMITTEE TO SECURE ROOMS FOR THE STATE HORTICULTURAL SOCIETY IN THE NEW CAPITOL.

At the January meeting of the State Horticultural Society the following resolution was adopted:

Resolved, That a committee, consisting of C. L. Watrous, A. H. Lawrence, Suel Foster, Al Swalm and G. B. Brackett, be appointed by this Society to ask of the Honorable Legislature a suitable room in the new capitol for the use, Library and Museum of this Society.

Under this resolution Senator Lawrence, one of the committee, promptly introduced a joint resolution giving the Society room or rooms in the new capitol building, which passed the Senate, amended so as to locate all the societies and State officers. The House took prompt action on the matter, and the Committee on Public Buildings, of which Hon. J. G. Hutchison, of Wapello, was chairman, gave the resolution the benefit of a special meeting and a unanimous report that it do pass. When the committee report was made, instead of having it passed on file, Mr. Hutchison very kindly, at the request of the committee, asked its present consideration, and with not a vote against it, the resolution passed.

To carry out the resolution a joint committee was appointed, consisting of Senators Lawrence, Woolson and Shelley, on the part of the Senate, and Representatives Seaman, Lewis of Fayette, and Colton, and the decision of that committee was that the State Horticultural Society should have rooms on the first floor, with a large store-room in the basement, which action was indorsed by the General Assembly by the adoption of a joint resolution.

The rooms set apart are in the east wing, on the south side of the main corridor. The museum and office are on the main floor—the first being 24x52 feet, 22 feet high, splendidly lighted with four large windows, while the Secretary's office could hardly be bettered. The store-room in the basement is as large as the museum, and immediately under it, well lighted, and can be used for meetings of the Society, if deemed best.

Digitized by Google

On the north side of the museum are two doors opening into the main corridor, and on the east end is a door opening into the office of the Secretary. This room is small, being 12x12 feet, but is well lighted and ventilated. The main entrance to the museum is at the foot of the main stairway, and within ten steps of the elevator.

We deem it proper to say that the Society is now permanently provided for, with rooms second to none in the country, and we are confident that the permanent exhibit of casts, etc., will be made extremely creditable to the Society and State.

On behalf of the committee,

C. L. WATROUS.
AL SWALM.

Digitized by Google

INDEX.

PAGE

Address, Opening, of President 22
Annual, of President 116
By Gov. J. H. Gear 170
By Hon. A. S. Welch 196
By Hon. Suel Foster 456
By A. F. Collman 508
Apple trees, Proper training of 41
Apple, Eastern Society, list of the 474
Report on the 462
Insects working on the 85
Propagation of the 220
Prairie varieties of the 320
Experimentation with the 362
The Gov. Gue 433
Apples, How to gather and store 44
Late keeping 426
Promising new varieties 451
Catalogue of 538
Arboretum, Report on the 111
Ash, Oak-leaved Mountain 374, 431
Ashes, Benefit of in the vineyard 402
Annual report of Secretary 122
American Pomological Society, Report of the 255
Agricultural College, Experimental work of 122
Asparagus, The Colossal 445
Avery, Robert, In memory of 136
Allen, W., Letter from 168
Arthur, Prof. J. C., Report by 241
Alder, The English, In Iowa 418

Blight, Of the apple tree 35, 168, 448
Blight, mildew and rust 66, 418
Blackberry, Discussion on the 460
The Barnard 326

Digitized by Google

PAGE
Budding in the spring 59, 430
Berberry, as a tree 400
How to grow seedlings of the 441
Bedding plants, Reports on 239, 480
Blackhaw, Improvement of the 399
Browallia, value of for cut flowers 420
Borer, The flat-headed 421
Bark-bursting of nursery trees 432
Bark-lice, Report on 73, 86
Buckwheat, Value of in the orchard 143
Birds, Our most useful 297
Barnard, Report by 326
Bessey, Prof. C. E., On the scab mite 209
Lecture by 130
Budd, J. L., Report by 121, 144, 464, 528
Bruce, J., Report by 174
Bruner, D. F., Report by 301
Bruning, F. W., Report by 184
Bancroft, Joseph, On green-house management 235
Bowers, Samuel, On bedding plants 239
On geraniums 477
Bogue, Mary C., Report by 244
Brackett, Col. G. B., On nomenclature 290
Beal, Prof. F. E. L., On most useful birds 297
Briggs, Moore, Report by 347, 418
Baldwin, J. D., Letter from 355
Beal, Prof. W. J., On food of garden mole 410
Beadle, D. W., On the Wilson strawberry 415
By-laws 533

Committee, Standing for 1880 10
On tree distribution 14
On fruit catalogue 14
To attend Institutes 14
On President's address 121
On awards on flowers 136, 267
On canned fruits 136, 268
On awards on fruits 136, 265
Report of, On President's address 227
On life memberships 282
To secure rooms in new Capitol 545
Case, L. B., On the blackhaw 399
Calkins, E. H., Report by, On orcharding 40
Canning fruits and vegetables 160, 268
Canning, Discussion on 163
Climate, Modifications of 301

Digitized by Google

PAGE
Catalogue of 1870 537
Croil, John, On McIntosh Red apple... 415
Caragana for hedging 400
Campbell, Geo. W., On top-grafting 411
Crossing of fruits..... 148
Catalpa speciosa, notes on the..... 64
Value of, for lawn planting..... 408
Training of the..... 420
Discussion on the..... 455
Cabbage Butterfly, Report on the..... 78, 82
Discussion on the..... 107
Codling Moth, Discussion on the..... 194
Cuttings, propagation by..... 224, 235
Cucumbers, Growing of, on trellises. 407
Cultivation, Effects of, on fruits..... 412
Catalogue, Descriptive..... 117, 127, 538
Conifers, Dissemination of new..... 126
Report on the Rocky Mountain..... 343
On the new and valuable..... 391
Japanese..... 435
Report on the most valuable 502
Cherry Orchard, Report on..... 182, 211
Crab, The Virginia..... 434
Top-grafting the wild..... 432
New varieties of the..... 356
Chinese Pears..... 147, 302, 400
Desirable fruits of the..... 354, 396
Raspberries 434
Collman, A. F., Report by..... 188
Address by 508
Cottonwood, Pistillate trees of the..... 424
Collossal Asparagus..... 445
Constitution..... 532

Districts, List of fruit..... 6
Drift Soils, Variation of..... 268
Davidson, Mrs. James, On pansy growing..... 364
Davis, Edward, Letter from..... 376
Downing, Charles, Notes by, on fruits..... ..... 320, 400
Douglas, Robert, Letter from..... 64
On new and rare conifers 391
Distribution of fruits and plants 118
De Soto plum, History of 33, 356
Delegates to American Pomological Society 255

Digitized by Google

PAGE

Directors, Report of Twelfth District 27
Report of Eleventh District 31
Report of Ninth District 109
Report of Eighth District 137
Report of Seventh District 165
Report of Sixth District 172
Report of Fifth District 191
Report of Fourth District 208
Report of Third District 229
Report of Second District 233
Report of First District 251
Annual Meeting of 288
To prepare notes for press 288
Duchess, valuable seedlings of the 357
Discussion, On blight .....
On orchard management 47, 59
On high and low headed trees 54, 61
On Catalpa speciosa 65, 110, 455
On injurious insects 107
On the arboretum 114
On vegetable physiology 134
On orchard culture 142
On plant breeding 150
On canning fruits and vegetables 163
On top-grafting 178, 469
On plum and cherry growing 184, 217
On grape growing 185
On evergreens 190, 502
On fencing 207
On pear leaf-blister 209
On pear orcharding 216
On hybridizing and crossing 219
On growing plants from cuttings 226
On scion and tree distribution 228
On floriculture 246, 483, 522
On forestry 278
On fruit tree peddlers 284
On pear list 474
On hedging 475
On our useful birds 476
On meteorology 487, 500
On small fruits 458
Dwarf Juneberry 423
Downer's Seedling strawberries 436

Digitized by Google

PAGE
Entomology, Report on.... ..... 73, 78, 82, 85, 487, 496
Entomological cuts..... 127
English sparrow 107
Eissen, Gustaf, on dry and wet soils..... 419
Experimental station 122
Evergreens and hardy shrubs..... 248, 502
Distribution of new..... 283
Report on new and valuable..... 391, 502
Report on Rocky Mountain..... 343
Edwards, Samuel, Report by 502
Eastern Iowa Horticultural Society, Report of 454
Essayists of the..... 506

Fruit Districts of Iowa..... 6
Fruits, Rules for judging of 19
Hybridizing and crossing of..... 218, 406
At American Pomological Convention..... 262
Premiums awarded on..... 265
In their relations to health 334
Fruiting, To induce by ringing and wiring 432
Fungi, Relation of to blight 66, 67
Fall Web-worm, Notes on the..... 86
Forestry, Planting of in Northern Iowa..... 28
Report on by Suel Foster..... 63
Appropriation to encourage 122
In the Northwest..... 167
Reports on..... 274, 292, 377, 380
Discussion on 278
Premium awarded on 373
Transplanting seedlings in 386
In Illinois..... 387
Pistillate trees in planting of 423
Foster, Hon. Suel, Report by on Forestry 63, 380
Report by as Director..... 208
Address by..... 456
On mistakes in orcharding..... 305
Farmers' Institutes, Committee to arrange..... 14, 115
Resolutions favoring..... 229
Floriculture, Reports on..... 235, 239, 241, 244, 364, 366, 477, 480
Fencing and planting of farms..... 329
Fence, Problem of solved 370

Gros Pomier apple, Notes on..... 140
Grape, Originating new varieties of the 147
Report on the..... 184
The Rogers' Hybrid 187

Digitized by Google

PAGE
Grape, Low training of the 398
Notes on Moore's Early 398
Leached ashes to improve the 402
Rot of the 402
Fall grafting of the 431
Promising new variety of 435
The Worden 436
Discussion on the 461
Eastern Society list of the 464
Galusha, O. B., On valuable new fruits 151
Gear, Gov. J. H., Address by 170
Gue, Hon. B. F., Director, Report by 172
Gaylord, Edson, On northern orcharding 315
Green, B. F., Report by 173
Graves, A. J., Report by 174
Gideon, Peter M., On origination of new fruits 358
Goss, Silas, Report by 362
Grasshoppers, In Eighth District 167
Grafting, In nursery propagation 221
How to make wax for 421
Of the Rose Acacia 440
Graft Hybrids, Of the potato and apple 440
Green-house, Management of the 235
Geraniums and Pelargoniums 477
Gardening, Market 349
Gas plant, Notes on the 438
Gooseberry, Smith's improved 397
Top-grafting the 418
Gibb, Charles, On strawberry apple 405
Goessman, Dr., On effects of culture 412

Heisz, E. R., On northern orcharding 56
Hart, F. W., On forestry 274
Hoskins, T. H., On iron-clad fruits 374, 412
Hoffmeister, Dr. Aug. W., Report by 82
Hinrichs, Prof. G., On meteorology 198
Hybridizing and crossing of fruits 218
Hedging, Report on 347
Caragana for 400
Discussion on 475
Honorary members 9, 170
Heat, A probable cause of blight 66, 168, 418, 448
House plants, Report on 245
Hanging baskets 238
Hough, Dr. F. B., Extracts from report by 296

Digitized by Google

PAGE
Haviland, A. J., Directors' report, by 109
On pear growing north 214

Ireland, L. G., Director, Report by 27
Iowa Weather Reports 200
Insects, Bark-lice 73
Blind-eyed Sphinx 88
Cabbage Butterfly 78, 82, 108
Grape Curculio 84
Oyster Shell Bark-louse 86
Fall Web-worm 86
Yellow-necked Caterpillar 89
Leaf-Rollers 91, 108
Rose Chafer 93
Twig-borer 94
Scotch Pine-louse 96
Grasshopper 167
Codling Moth 194
Mite, causing pear blister 209
Tarnished Plant-bug 230
Flat-headed Borer 421
White Grub-worm 496
Strawberry Crown-borer 497
Strawberry Leaf-roller 498
Structure, Report on 487
Injurious to the strawberry 496

Jordan, E. B., Report by on blight 36
Japanese Pears, Notes on 304
Japanese Conifers, Notes on 435
Jefferson County, Notes from 376
Juneberry, Dwarf 423
Grafting quince on the 440

Key, To list of insects working on the apple 86
Kemble, Amos, On canning 163
Kulp, Dr. William O., Remarks by 246
Report by 366, 480
Knowles, G. A., On seedling apples 311
Kellenberger, J. U., Report by 349
Kyanizing, To preserve plant labels 407

List of Standing Committees 10
List of premiums offered 15, 16, 17, 18
Late Strawberry apple of Canada 405
Lime and sulphur wash for trees 36, 39, 71, 444
Linn county, Report from 484

Digitized by Google

PAGE
Le Conte Pear, Notes on the..... 417
Lake, Thomas, On forestry 387
Leaf-rollers, Notes on 91, 92
Discussion on 108
Leaf, Its structure and modification..... 130
Of the oriental fruits..... 132
Laws relating to Horticulture..... 535
Lummis, Prof. W. D. F., Report by.....111, 201
Lathrop, H. W., Report by as Director..... 191
On soil variations..... 268
Lawns, Laying out and fencing of.....197, 201
Life membership.....112, 127, 286
Landscape Gardening, Report on..... 366
Late keeping varieties of the apple..... 426
Live fence posts..... 428
Lima Beans, Growing of without poles..... 444
Lindley, Dr., On relation of stock and scion..... 465

Members, List of for 1880..... .....7, 507
Meeting of Directors..... 288
McIntosh Red apple 415
Management of the orchard.....40, 48, 56
Meteorology, Discussion on..... 485
Muscatine county, Report from 326
Market Gardening, Report on..... 349
Moore's Early Grape..... 398
Mitchell, J. B., On northern fruits 32
Mathews, B. A., Report by..... 211
Macomber, Prof. J. K., Report by..... 292
Mathews, Prof. J., Reports by.....324, 374, 403
McAfee, Prof. H. H., Letter of..... 314
Meehan, Thomas, On shading fruit soils..... 409
On top-grafting the gooseberry..... 418
Miner and De Soto plums 33
Miner plum, Notes on 28
Mites, Producing pear leaf-blister 209
Mole, Food of the garden..... 410
Maple, Bark-lice of the..... 75
Mulching of orchard soils 34, 142
With sand 141, 142
With peat..... 423
Of small fruits..... 439

Names of members for 1880.....7, 507
Northern orcharding.....59, 63, 65
Northern fruit districts, Report of the 236

Digitized by Google

PAGE

Nursery management, Report on 287
Nursery, Condition of trees in the 429
Nomenclature, Notes on 105
Committee on 286
Report on 290
Standing Committee on 240
Ninth District, Report of the 208
Norway Spruces, Selecting of 442
Native Flowers, Report on 241
Noxious Insects 73, 78, 82, 85, 253
Neally, G. C., On ornamental trees and shrubs 388

Officers and Directors, 1880 5
Election of 195
Of Eastern Society 484
Of Western Society 511
Osborn, C. P., Report by 462, 484
Osborn, Herbert, Report by 85, 496
Oberholtzer, G. W., Essays by 329, 370
Ornamental grounds 197
Ornamental trees and shrubs 388
Obituary, Death of Robert Avery 136
Oldenburg apple, Notes on the 32, 417
Oleander, Training of the 420
Orchard, Shading of trees in the 33
Whitewashing of trees in the 36, 37, 71
Management and varieties of the 40, 48
Shaping of trees in the 41
Cultivation of the 141
Soil shading in the 409
Sheltering the 439
Orcharding, At the North 56
In Central District 48
In Southern District 40
How to make profitable 305
Report on northern 315

Premiums on forestry plantation 15, 16
Offered on fruits and flowers 17, 18
Awarded at American Pomological Convention 259
Awarded at winter meeting 265, 266, 267, 282
President, Opening address by 22
Annual address of the 116
Peaches, Chinese and Chilian 354, 355
Growing of in Iowa 443

Digitized by Google

PAGE
Pomological Nomenclature 290
Pelargoniums, Notes on... 245
Essay on..... 447
Persimmons, Chinese..... 396
Plants, Propagation of..... 237
Variations of..... 491
Potatoes, Desirable new sorts of..... 353
Peddlers, Resolutions on fruit tree..... 283
Practices of 287
Parry, Dr. C. C., On Rocky Mountain conifers..... 343
Patten, C. G., Report of as Director 31
Peffer, G. P., New seedling pears of..... 437
Report by..... 218
Pugsley, M., On tarnished plant-bug..... 230
On top-grafting..... 313
Pitts, T. J., Report from 36
Putnam, Prof. J. D., On bark-lice 73
Philbrick, Dr. S. D., On Rogers' grapes 187
Parsons, Samuel, On Catalpa..... 408
Pansy, Report on growing the 364
Pruning of orchard trees 138, 193
In the nursery 222
Potash, Effect of in modifying fruits..... 412
Plant Breeding, Essay on 144
Discussion on..... 150
Plant labels, How to make durable..... 407
Pear, Blight proof varieties of the..... 147
Blight of the 418
Report on the 182, 213, 214
New, or little known kinds of the..... 302
Notes on growing the..... 324
The Le Conte..... 417
Growing of the, on the prairie..... 426
Third generation of the..... 437
Discussion on the 474
Eastern Society, list of the..... 474
Plum, Report on growing the.....183, 212
De Soto 23, 356
Propagation, Of new varieties of the apple..... 358
By root-cuttings..... 394
Peat, for orchard mulching..... 423
Pistillate forest trees inferior 424
Strawberries 437
Posts, Tarring of fence..... 424
Live fence 428

Digitized by Google

PAGE

Quince, Grafting of on Juneberry 440

Rules for judging fruits 19
Raymond, H. C., Report by 160, 377
Report by as Director 229
Rogers, A. C., On De Soto plum 356
Root-cuttings, Propagation by 394
Report, Of Treasurer 24
On orchard management 40, 48, 56
On causes of mildew and rust 66
On Bark-lice 73
On Cabbage Butterfly 78, 82
On insects working on the apple 85
On Scotch pine-louse 96
On arboretums 111
Of the Secretary 121
On the leaf and its modifications 130
On plant breeding 144
On valuable new strawberries 151
On promising new raspberries 157
On canning fruits and vegetables 160
On the cherry, pear, and plum 182, 211
On new grapes and small fruits 184
On Roger Hybrid grapes 188
On shade and ornamental trees 188
On laying out and planting grounds 196, 201, 329
On rain-fall and timber 198
On propagation and management of the pear 214, 302, 324
On propagation of the apple 220
On growing trees and plants from cuttings 224
On President's address 227
On green-house management 235
On bedding plants 239
On our native flowers 241
On house plants 244
On evergreens and hardy shrubs 248
Of delegates to American Pomological Society 255
On drift soil variations 268
On forestry 63, 274, 377, 380, 383
On nomenclature 290
On timber growth on prairie soils 292
On our most useful birds 297
On seedling apples 311
On northern orcharding 315
On fruits in their relation to health 334
On Rocky Mountain conifers 343, 391

Digitized by Google

PAGE
Report, On hedging 437
On vegetable gardening 349, 352
On new and hardy apples 358
On landscape gardening 366
On top-grafting 464
On plant variations 491
Rose Chafer, Note on the 93
Rose Acacia, Top-grafting the 440
Russian Transparent apple 443
Russian fruits 122, 123, 287, 308, 309, 411, 414
Raspberry, The Turner 427
Valuable new sorts of 157
Chinese variety of 434
Discussion on the 460
Eastern Society, List of the 460
Resolutions, Relative to fencing 207
On library appropriations 207
On board of agriculture 229
On farmers' institutes 229
On rooms in capitol building 264
On State Geologist 264
On distribution of conifers 283
On fruit tree peddlers 283
On change of third and seventh districts 285
On forestry exemptions 285
Of thanks to P. M. Gideon 285
On fruit casts and wood specimens 286
On life memberships 286
Final 287, 504
Rogers' Hybrid grapes, Report on 187

Seward, Hon. Geo. F., Letter from 354
Scofield, D. C., On relative growth of forest trees 383
Spaulding, G., On Miner and De Soto plums 33
Speer, Hon. R. P., On blight and rust 66
Report of, as Director 137
Smith, J. C., On crossing of fruits 406
Smith, Dr. Wm. R., On fruits in relation to health 334
Smith, Miss Emily, On bark-lice 77
Swalm, Al., Report by 175
Shaw, Geo. W., Report by 233
Sexton, J., On vegetable garden 352
Strawberry, Best varieties of the 38
Its stages of improvement 148
Valuable new varieties of the 151
Downer's Seedlings of the 436

Digitized by Google

PAGE
Strawberry, Varied fruit of the pistillate 437
Eastern Society, List of 460
Insects injurious to the 496
Scotch pine, Louse infesting the 96
Seedling varieties of the apple 145, 311, 357
Shrubs, For lawn planting 204
Scions and tree distribution 228
Stock, Influences of the scion on the 221, 411, 445, 464
Scab, Cause of, on the apple 210
Synonyms, Of European fruits 408
Structure of insects 487
Salt on strawberry beds 38, 144, 167, 169
Secretary, Annual report of 121
Sap, Movements of the 135
Soils, Best for orchard 139
Shading of orchard 409
Effects of dry and wet 419
Variations of, Report on 268
Small fruits, Report on new varieties of 151, 185
Mulching of 439
Discussion on 458
Shelter belts for orchards 180
Shade and ornamental trees 188
Scions, Keeping of, for spring budding 430
Sac county, Fruit growing in 321
Stanton, James, New grape of 435
Spruces, Selection of 442

Treasurer's report 24, 505, 512
Top-grafting, On the crab stock 35, 57, 138
Discussion on 47, 51, 178, 469
In Central District 178, 432
Report on 213, 403, 411, 464
Tops, Height of in orchards 50, 55, 60, 61
Thatcher, J., Report by as Director 251
Tarring of soft wood posts 425
Twig borer, Notes on the 95
Trees, Ornamental and shade 188, 203
Relation of to rain-fall 198
Growth of on prairie soils 292
Planting of to modify climate 301
Condition of in nursery 429
Bark-bursting of nursery 432
Turner raspberry, Notes on the 427
Tomato, Mixing of varieties of the 446

Digitized by Google

PAGE
Teas, E. Y., On Oriental pears ... 302
On Smith gooseberry ... 397
Tuttle, A. G., Report by ... 308
Terry, H. A., Report by ... 522
Tatum, Elwood, Report by ... 321
Premium awarded to ... 373

Utilizing, Of fruits ... 183
Of White Thorn ... 447
Union county, Report from ... 336

Varieties of the Apple, In Central District ... 50
In Southern District ... 46
In Northern District ... 57
Vegetable Garden, Reports on ... 349, 352
Videl, T. G., Letter from ... 357
Vernandoe, L. L., On Le Conte pear ... 417
Virginia Crab ... 434
Virginia Creeper ... 436
Variation of plants ... 491

Wragg, J., Report by on orcharding ... 48
Walton, Miss Alice B., Report by ... 78, 487
Witter, Prof. F. M., On plant variations ... 491
Watrous, C. L., Report by ... 220
Annual Address of ... 116
Wright, Hon. George H., Report by as Director ... 165
On plant propagation ... 224
Whitman, J. D., Report by ... 173
Williams, L. A., Report by ... 182
Welch, Hon. A. S., Address by ... 196
Wilson, Silas, Report by ... 248, 526
Williams, Hon. S. W., Letter from ... 354
Wood, H., Letter from ... 356
Western Iowa Horticultural Society ... 508
Whitewashing orchard trees ... 36, 37, 71, 444
Winter St. Lawrence apple ... 402
Wax for top-working ... 421
Wiring of branches to induce fruiting ... 423
Wind-breaks, On south and west of orchards ... 439
White thorn, Utilizing of the ... 447
Wolf River apple, Notes on the ... 406
Wilson strawberry, Its history ... 415
Worden grape, Notes on the ... 436

Yellow Transparent apple ... 411

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

THIS BOOK IS DUE ON THE LAST DATE STAMPED BELOW

AN INITIAL FINE OF 25 CENTS
WILL BE ASSESSED FOR FAILURE TO RETURN THIS BOOK ON THE DATE DUE. THE PENALTY WILL INCREASE TO 50 CENTS ON THE FOURTH DAY AND TO $1.00 ON THE SEVENTH DAY OVERDUE.

UCD LIBRARY

DUE JUN 30 1981
MAR 16 1981 REC'D

LIBRARY, COLLEGE OF AGRICULTURE, DAVIS
UNIVERSITY OF CALIFORNIA
5m-9,'39 (1359s)

Digitized by Google

38027		SB21
Iowa state	horticultural	I7
society.		v.14
Report.		1879

Ia. state Hort. soc.

SB21
I7
v. 14
1879

38027

LIBRARY, COLLEGE OF AGRICULTURE, DAVIS
UNIVERSITY OF CALIFORNIA

175 00693 5913

Digitized by Google